

Subterranea

December 2003

Issue 3

In This Issue
Annual Study
Weekend
Pembrokeshire

East German
Mini Tour

Books, News and
Reviews

A new section is now online at
www.subbrit.org.uk
covering non coldwar sites

The Newsletter of Subterranea Britannica and The Cold War Research Study Group.
www.subbrit.org.uk

Subterranea

Subterranea Britannica is a society devoted to the study of man-made and man-used, underground structures and the archaeology of the Cold War. The main focus of interest is on abandoned and forgotten structures and, in the case of Cold War structures, studies are entirely confined to declassified and decommissioned structures. The society is open to all and its membership includes all walks of life. Members are invited to contribute to this newsletter even if this just means sending very welcome snippets from newspapers and magazines.

Editor

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Newsletters of Subterranea Britannica are published by the committee of Subterranea Britannica. Original articles, book reviews, press cuttings, extracts from books and journals, letters to the editor etc. are welcome. However the editor reserves the right not to publish material without giving a reason.

The committee of Subterranea Britannica and the editor do not necessarily agree with any views expressed and cannot check the accuracy of any material sent in.

News

Bunker to open under tunnel

A SERIES of emergency bunkers is to be built under the River Mersey to cope with disaster in the tunnels. The £7m scheme will see seven fireproof caverns built under the Queensway Tunnel where trapped motorists can shelter in the event of an underground inferno.

Engineers hope the bunkers, which will hold a total of 980 people, will prevent a repetition of the 1999 Mont Blanc disaster when 39 people were killed in a road tunnel blaze.

Mersey Tunnel senior manager Peter Bishop said: "In the event of a fire in the tunnel, motorists would leave their vehicles and pass through air-locked doors to a refuge, where they would stay until rescue."

Fire-fighters would have two hours to get to the motorists through emergency escape tunnels before the bunkers lost their heat resistance.

Two way video-phones would allow fire crews to communicate with any stranded motorists during a rescue effort.

Exclusive By Mark Hookham Daily Post Staff

Fully armed Nazi bomber planes 'buried below East Berlin airport'

AN AIRPORT used by hundreds of thousands of tourists and business travellers each year could be sitting on top of thousands of live bombs. Papers among thousands of files captured from the Stasi, the secret police of East Germany, claim tons of live Second World War munitions were buried in concrete bunkers beneath the runways of Schoenefeld airport in East Berlin. It is now the main destination for discount airlines, such as Ryanair, and numerous charter companies.

Not only did the commissars inter munitions beneath the runways, but also entire Nazi fighter planes, all fuelled and fully bombed-up, according to the Stasi.

The captured files of Interflug, the former East German government airline and the airport authority of the DDR, are now being examined to see if the Stasi claim is true.

Experts believe it entirely feasible that, in the aftermath of the Second World War, with Berlin littered with millions of tons of unexploded ordnance, the Soviets could well have pressured local officials to move to clear the airfield as swiftly as possible.

"They would have stuffed them anywhere they could - there was simply too much stuff to blow up all at once," said Karl-Heinz Eckhardt, a Berlin historian. "There was a warren of massive Nazi bunkers beneath the site of the present airport that would have suited their purposes."

City authorities claim the airport is perfectly safe, but

a thorough check on the claims in the Stasi files - 140 km of them that will still take a number of years to decipher - is being undertaken.

Nearly two million passengers a year pass through Schoenefeld. According to the Stasi files, the ammunition was buried in bunkers between eight and nine metres deep.

A spokesman for the airport said: "We became aware of the bunkers in 1993, four years after the fall of the [Berlin] Wall. A check was undertaken then and everything was determined to be safe."

But he conceded that he was astounded at the claims that fully-fuelled and bombed-up aircraft lie beneath the runways and said new tests about the safety of the structures will be carried out. He added: "We had no idea that so much ordnance is supposedly under there."

Frank Henkel, the Conservative interior ministry spokesman, said: "This must be investigated thoroughly and immediately and the runways strengthened if necessary."

Berlin, with its sandy, dry soil, was perfect for the bunker-building of the Third Reich. Hundreds of thousands of them were constructed during the 12-year lifespan of the Nazi government: for every one metre of building above ground in modern-day Berlin, there are three metres below ground. Bunkers are being discovered every day and a group called Underground Berlin has turned several of them into tourist attractions.

By ALLAN HALL published by INTEL RESEARCH

Plans to demolish nuclear bunker

Plans to demolish a Grade II listed nuclear bunker in Cambridgeshire, have been criticised by conservationists.

Countryside Properties have put forward a planning application to build houses on the site of the bunker in Brooklands Avenue, Cambridge.

The bunker was built to serve as the centre of government for the east of England if a nuclear war had broken out during the Cold War. In July the building was given a Grade II listing.

Following the planning application English Heritage has expressed concerns about the proposals to demolish the structure.

An English Heritage spokesman says in a statement that it was disappointed as the bunker is of national importance. The spokesman says it is hoped alternative approaches can be discussed with the developers and the local authority, which would allow for the re-use of the structure.

The plans will go before Cambridge City Council at a future date

From BBC News

News

Secrets of Cold War Bunker Revealed

A nuclear bunker built when the world feared global annihilation had its secrets unveiled for the first time today.

The 50-year-old shelter, tucked away in a field in north London, was one of four bunkers dotted around the capital from which the city would have been governed in the event of a nuclear war. Standing unused and derelict for more than half a century, the concrete building, which stands above ground, had its doors opened to the Press as part of a ongoing campaign by English Heritage to protect a unique period of British life.

The tour coincides with the launch of a new book by English Heritage which reviews and researches key buildings involved in the Cold War which ran for almost five decades. The bunker, which is near Mill Hill East Tube station, is known as the war room and is likely to have been home to a senior civil servant and 50 staff, should the nuclear age's worst nightmare have come true. Its location and use was kept a secret and, although now derelict, many of the fittings and facilities remain untouched and as they were 50 years ago. They include boxes of chemical toilets, a kitchen complete with cooker and a now-empty control room.

The shelter, measuring 60ft by 40ft, is now one of only two surviving London shelters built in the early 1950s. They were built above ground because the threat of an atomic bomb on London meant they could have withstood the blast and would have been sealed up to protect against radiation. However, by the mid 1950s nuclear weapons had become even more powerful and more effective shelters had to be built even further away from London and underground.

The other remaining bunker, in Chislehurst, Kent, has now been turned into a £3 million house. The other two, at Cheam and Wanstead, have both since been demolished. English Heritage researcher Wayne Cocroft said: "The four were all built in 1952 and were designed to be on the four corners of London. "The thinking was if a bomb landed on central London the shelters would survive the blast and the various governing bodies would be based in the four shelters.

"It would have been senior civil servants and administrators as opposed to the Cabinet who would have been further a field.

"They are a fascinating part of British history and were built when the country was gripped in the fear or prospect of a nuclear conflict and a Soviet attack. "They may not look particularly special but they are nevertheless still an important part of our heritage." The bunker at Mill Hill East was listed as a Grade II building last December and English Heritage hopes

many more bunkers and other Cold War facilities will follow suit.

The organisation was today launching "Cold War, building for nuclear confrontation 1946-1989" - a book written by Mr Cocroft and Roger Thomas. The book looks at a wide range of facilities key to the Cold War period, including air bases, missile sites, command centres and above ground and underground bunkers.

English Heritage feared that various Government disposals and sales programmes could eventually result in the demolition of most Cold War installations. The book is now part of the process to research and protect key sites. A former Royal Observer Corp headquarters at York and missile shelters at Greenham Common, west Berkshire, have already been scheduled, a spokeswoman said. English Heritage chief executive Dr Simon Thurley said: "The Cold War period is an incredibly defining part of all our lives. For many years we had a backdrop of protect and survive, Greenham Common and four-minute warnings. "You're left with a good chunk, over 50 years, of life in our country. "These buildings are the physical remains of this and we want to keep some of them." There are no plans to open the Mill Hill East bunker to the public.

By Tom Whitehead, PA News

Probe launched as homes sink Ancient chalk mines blamed

An investigation has been launched into centuries-old underground chalk mines that have been causing Hatfield homes to sink into the ground. The mines, thought to be up to 200 years old have brought misery to residents of Briars Lane, Hatfield, who have seen their homes suffer structural damage since 2001. Property in the street has been boarded up and propped up with scaffolding after being declared unfit to live in and holes up to 30-feet deep have opened up in gardens.

The district and county councils have employed a specialist engineering firm, at the cost of £30,000, to drill boreholes and investigate the extent of the problem in and around Briars Lane.

David Dillingham, 28 who lives next door to one of the worst affected houses on Briars Lane, said: "The Council have been keeping us informed and as long as they do I'll be happy."

"I've been the lucky one out of all of us who live on this part of the road. Apart from cracks near the bathroom, I've had no problems. But some of the houses have had it really bad. "Les Ensby, who also lives on the street, said the stress of the situation had made his friend and neighbour Carol Boot ill.

A Welwyn Hatfield Council spokesman said: "We have had meetings with residents that have been

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affected and we are planning to hold a public meeting in the neighbourhood to which local residents will be invited." Councillor Richard Smith said: "It goes without saying this council will discharge its responsibility correctly. "Caroline Rawle curator of Welwyn Hatfield Museum Service said: "Details of chalk mining are very sketchy. There are some maps that show chalk but they aren't very detailed and there is no official map. "The mines could go back to Victorian times as there was no real chalk mining before then."

The article includes a photograph of a rather casual caver in the entrance to a chalk cutting plus a few shots of a journalist surveying the unfortunate homes.

By Ruth Williams Welwyn Hatfield Times

Greenham missile silos Sold

The Newbury Weekly News announced recently that the Greenham missile silos have been sold. They went for £317,500 to an Essex based company, Flying A Services. The company has a collection of vintage aircraft and was looking for somewhere to keep and possibly display them.

The company say that the initial plan is to work with the Secretary of State and English Heritage to first restore the site back to its former state before revealing further plans that are currently under discussion with the local authority

Also in the same edition are details of the lottery funded website 'Greenham - a Common Inheritance' see: www.greenham-common.org.uk

This has been set up by David Hawkings who spoke to Sub Brit on the subject at Hack Green recently.

By Ian Walker

Don't Bunker My Homes Bid

Developer Kevin Howe today urged councillors to ignore campaigners and allow him to turn his Cold War nuclear bunker into two luxury homes. Mr Howe, managing director of Kingston Homes, was yesterday told his plans to turn part of Wawne Bunker, at Cedar Close, Wawne, between Hull and Beverley, into a three-bedroom bungalow, worth £170,000, must wait. East Riding planning councillors decided to delay a decision until they have seen the site for themselves. Four houses have already been built on the site and the front part of the bunker has already been converted into a four-bedroom home for Mr Howe, his wife and two children. Now he wants permission to convert the section of the bunker

earmarked for a museum into a second home. Mr Howe said: "Once they have seen the site, I hope they will reach the right decision.

"The majority of people in this village do not want the bunker as a museum and I intend to build a bungalow from it while keeping the external appearance intact." The 38-year-old businessman faces opposition from members of the Wawne Bunker Trust. It wants the building kept open as a public attraction. But the trust has struggled to meet the criteria to open the facility as a museum, although it is still pledging to do so. Mr Howe said of the trust: "I am sick of the unfair criticism from what is a very small organisation."

The facility, built during the 1950s Cold War period, was originally owned by East Riding Council. It closed in 1996 and was sold to Lakeland Developments on condition the rear section of the bunker was retained for development as a museum. Mr Howe later bought it. Mr Howe added: "The trust has not paid one pence towards the running costs of the bunker for the time they used it. I am trying to complete a development for which we have had nothing but praise for." But Dave Skinner, vice-chairman of the trust, said it would be sad if the council granted planning permission. "We would have to look at some legal challenge if that was to happen," he said Dr Eric Grove, director of the Centre for Security Studies at the University of Hull, backed the trust, saying: "We feel it can become a museum and, with the right publicity, people will come to visit it." Planning officers are recommending Mr Howe's scheme be approved.

From Hull Daily Mail via Steve Medcalf

Italy - US Ammunition Storage Bunkers

Italians were 'stunned' in January to discover that 'the biggest American ammunition dump outside the United States', was located between Livorno and Pisa.

The Camp Darby US base near Stagno was set up in 1951, and includes underground controlled-temperature munitions storage bunkers established in the 1970s which, 'two years ago', had begun to develop 'structural problems.' Attempted repairs have made things worse, and 'chunks of cement' had fallen on the stored weapons.

Twelve of the bunkers had been 'cleared of their contents with extreme caution with bomb squads removing 100,000 missiles and bombs and 23 tonnes of high explosive with the help of remote-controlled robots.' Reportedly, 'it was a small miracle that nothing had gone wrong.'

From The Times 14/1/2003

News

Pyongyang - North Korea Underground Museum trips

Tourist flights, for South Korean nationals only, have commenced between Seoul and Pyongyang. One possible destination is a man-made complex of some 200 dug caves in mountains about 70 miles north of the capital. These contain the presents sent, before and after his death, to the 'Great Leader' Kim Il Sung, including a complete train given by Josef Stalin.

From The Times 18/9/2003

Russia - Siberian Prison Escape Tunnel

A prisoner attempting, unsuccessfully, to escape from a penal colony in Siberia, has dug the longest recorded escape tunnel. Yevgeny Pechenkin and two cell-mates dug the 113 metre (370 feet) tunnel two years ago, providing it with beams, electricity, and ventilation. His sentence (for fraud) has been extended by 30 months.

The Guardian 28/2/2003

Channel Tunnel Rail Link Tunnelling induced collapse at Stratford

The collapse of gardens of houses in Lavender Street, Stratford, apparently caused by CTRL boring on Saturday 8 February was reported

A report with a map and sections in the *New Civil Engineer* gave further details. The collapsed ground did not penetrate the CTRL rail tunnel, but appears to have filled at least two and possibly three brick-lined wells close to the new tunnel. This and consolidation of the Thanet Sand (in which the tunnel is bored at this point) appears to have accounted for the void created at the rear of the Lavender Street houses. At least 300 m³ of concrete have been poured into the void, a '10 m diameter, 20 m deep chasm.'

The CTRL is intended to pass below this area in two parallel 8.15 m diameter lined tunnels in the Thanet Sand. These are being bored eastwards. The leading (southern) tunnel TBM had already passed below the two LU Central Line tunnels below Angel Lane without incident, and passed had passed under Lavender Street at a depth of 21 m 36 hours before the ground failure. As the tunnel is lined, none of the collapsed material entered it.

There is 4 m vertical clearance between the CTRL tunnel and the eastbound Central Line tunnel (and 8 m for the westbound tunnel.) The northern TBM had not yet quite reached Angel Lane at the date of the

Lavender Street collapse, and was halted. Tunnelling below the Central Line tunnels will not recommence until LU are satisfied there is no risk of their tunnels being damaged. Central Line trains had already been halted as a result of an unrelated derailment at Chancery Lane on 25 January caused by a mechanical failure. Tunnelling re-started in April.

From Paul Sowan

Boulby Underground Laboratory open in Potash Mine

The official opening of the Boulby Underground Laboratory for Dark Matter Research 3,500 ft underground in a part of the 560 miles of mine tunnels in the Boulby potash mine was reported. The facility's purpose is particle physics research

From The Times 30/04/2003

Planned Closure of Higham and Strood Railway Tunnels

Network Rail plan to close the Higham and Strood railway tunnels, between Higham and Strood Stations, for 12 months commencing 1 January 2004. Railway services between the two stations will be replaced for this period by bus services. The unlined chalk tunnels are to be lined with steel-reinforced concrete to minimise the risk of further falls of chalk. Originally planned as a single long canal tunnel, with a large cavern near the centre where boats could pass, the tunnels are cut through chalk and were made in 1820 - 24 for the Thames and Medway Canal Company as a short cut from London and Gravesend to the Medway ports area, eliminating a long detour around the Isle of Grain. As a result of instability in the chalk, the intended passing loop cavern was opened out, making the work two tunnels with a very short gap open to the sky. Higham tunnel is 1,531 yards, and Strood tunnel 2,329 yards, with a 50 yards gap between them. The two and a quarter mile tunnel was not a success in canal use, and in 1844 the Canal Company built a single line of railway track along one side, partly on a towpath and partly cantilevered out over the water. For some years the tunnels were used both by canal boats and by trains - from 10th February 1845 the Canal Company operated a service of six trains a day. In the following year the Canal Company was purchased by the South Eastern Railway, and in due course the canal was filled in and a second rail line laid through. Much of both tunnels was unlined, and falls of chalk have been a recurring problem up until recent years.

[Information from the Connex September 2003 pocket timetable, and Alan Blower's, British railway tunnels (Ian Allan, 1964)]

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Welbeck Abbey - Folly or Epitome

Welbeck Abbey acquired fame, for its tunnels, after 1854 when it was inherited by Lord John the Fifth Duke of Portland. He had retired from public life as a Member of Parliament in 1826, and was keenly aware of the technological advances of the times. His retirement and subsequent existence as a near recluse was possibly the consequence of his disabling psoriasis. He developed his estate in Nottinghamshire's Sherwood Forest on a grand scale before his death in 1879, employing thousands of people. Amongst the developments were two and a half miles of underground passages, some of which were accessible to two horse-drawn carriages passing side by side. There was also an underground railway.

Submitted by M.H. Tadd - source Follies (Folly Fellowship) 56, Autumn 2003 issue, which includes a photograph showing the underground railway

Explore Underground Berlin by Night

Linda Bartlett and Martin Dixon have visited Berlin recently, and recommend an unusual city tour, at dead of night, open to the public. This is a tour, on a roofless carriage (I think hard hats are provided), zapping about the Berlin underground railways in the small hours, taking in bits of former East and West Berlin, and taking in those bits of link lines not normally traversed by regular service trains during the day. As I understand the leaflet (in German, but with a map) Linda and Martin have given me, the tour starts at Alexanderplatz station, reverses outside the station and goes via Jannowitzbrücke to Heinrich-Heine-Straße, then reverses and goes back to Alexanderplatz in a higher-level tunnel to Osloer Straße (reversing beyond the station again to another line on another level), then by way of another obscure non-public 'curve' to reverse in Seestraße (photo-stop), then a long run (done slowly) to Hermannplatz (running twice through the station) and another reversal and obscure connecting curve for the final run back to the starting station.

Contact Linda or Martin for more details, or look at <http://www.bvg.de> or email bvg@bvg.de or telephone [Berlin] 19-449 or 256-265-69 / 70 or 256-271-71. What you want to know about is called NACHTFAHRTEN (night tours.)

From Paul W. SOWAN

Korean War Tunnels and Military Geology

A recently published North American book on *Military Geology in War and Peace* contains an interesting series of 25 papers on military geology in the 19th and 20th centuries, including two by C.P. Cameron describing activity and tunnelling in the demilitarised zone between North and South Korea. The first paper, *Dearly bought ridges, steep access valleys, and staging grounds: the military geology of the eastern DMZ, central Korean Peninsula*, describes the relevance of the geology of this mountainous area to military activity. The second, *Clandestine Tunnel-4, northern Punchbowl, Korean Demilitarised Zone*, describes the detection of a North Korean military tunnel heading southwards, as a result of boring (on the south side of the border) to a depth of 145m. A borehole television camera 'provided clear images of artefacts of human tunnel-construction activity.' A three-metre diameter tunnel-boring machine was subsequently used to gain access to the estimated 2.1 km clandestine tunnel. It is suggested that the North Koreans observed the investigations in progress in South Korea, and consequently abandoned this particular attempt to pass below the DMZ, although other such tunnels are known.

Source: James R. Underwood and Peter L. Guth (editors), 1998, Military geology in war and peace. Geological Society of America: Reviews in Engineering Geology XIII, pages 83 - 98 and 99 - 110 [ISBN 0-8137-4113-0]

More Military Geology

A British compilation of papers on *Geology and Warfare* has been published recently, containing 15 papers dealing with medieval to 20th century topics. There are contributions on both British and German aspects of battlefield geology in World Wars I and II, and one on *Geology and the Fortress of Gibraltar*.

Source: Edward P.F. Rose and C. Paul Nathanail (editors), 2000, Geology and Warfare: examples of the influence of terrain and geologists on military operations. Geological Society of London: xiv + 498pp [ISBN 1-86239-065-7]

Gilmerton Cove Edinburgh

Gilmerton (Midlothian, NT 2968) is now a suburb of Edinburgh, falling just within that city's local equivalent of the M25. John Gorton (1832), in his *Topographical Dictionary* (II, page 86), described it as a village four miles south of the city, in the parish of Liberton, 'inhabited by persons employed in the neighbouring limestone quarries, in the collieries, and

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in carting coals to the metropolis.' Life was, however, for the few, far from all work and no play. In the 17th century a mansion and its estate existed, the grounds provided with a subterranean diversion known today (and rejoicing in their now location below a shop in Gilmerton High Street) as Gilmerton Cove. The word 'cove' (OED II, page 1099) is recorded from the 9th century onwards, meaning a small chamber or cell, and from the 10th century (especially in Scotland and the north) as a hollow or recess in a rock, cave, cavern, or den. Gorton's *Dictionary* entry goes on to record that 'At the northern extremity of the place are several apartments cut in the solid rock, by a blacksmith named Paterson, about a century ago, also a curious well.'

Both the Cove and the limestone mines have been in the news recently. The Cove is in good condition, and under consideration for opening as a visitor attraction. Collapses in the limestone mines, however, have led to emergency measures in relation to houses and flats built near or above them.

From Paul W. SOWAN

Charlestown Limestone Mines Fife

Charlestown, an 18th century purpose-built industrial village, lies (with its sister village Limekilns) on the northern shore of the Firth of Forth between the Rosyth dockyards and Crombie RNAD.

Robert Hunt, in 1860 (*Mineral statistics .. Part II. for 1858*, Memoir Geological Survey, pages 301 - 305) cites lime production at Charlestown as 90,000 tons per annum, but nothing at Limekilns. Evidently the focus of lime-burning activity had by then shifted westwards to the new village. Thus there is an impressive and massive bank of kilns at Charlestown, but now no trace of such structures at the older village.

It was reported in 1910 (B.N. Peach, et al., *The geology of the neighbourhood of Edinburgh ..*, Memoir Geological Survey, page 354) that 'For the last ten years the limestone has been got by mining, and the average output for the past three years is 6,500 tons. The lime is principally used by builders and plasterers, and a considerable quantity of ground lime is sold for agricultural purposes in the months of April and May.' William Black was at that time works manager. The limestone was stated to be 83.58% calcium carbonate, 8.94 % magnesium carbonate, with subsidiary quantities of aluminium and iron compounds, and silicates.

The freight and passenger rail services from the closed Dunfermline - Kincardine - Alloa - Stirling line have long since been withdrawn, although there are still very infrequent trains using most of the Charlestown branch to gain access to Crombie

RNAD. It is not clear if the depot is to any extent underground. The outcrop of the limestone seam mined at Charlestown appears not to extend in that direction.

Paul W. SOWAN

New Undersea Tunnel in Faroe Islands

The (very small) international airport on the island Vágur has until recently been a long and awkward journey from the capital, Tórshavn, on the adjoining island Streymoy. The journey required a bus link from Tórshavn to Vestmanna, then a ferry across Vestmannasund, and finally a further bus ride to the airport, the whole taking over two hours.

The 22 Faroe Islands, 17 of which are inhabited (population about 47,000), are a self-governing region of Denmark, have their own language (Faeroese), and issue their own bank notes and postage stamps. The mountainous archipelago has seen many major civil engineering works during the last half century, with several long tunnels under mountains, and some islands linked by causeways or bridges. The two islands Vágur and Streymoy have now been joined by an under-sea tunnel, allowing quicker transit times between the capital and the airport.

The tunnel under Vestmannasund, called Vágatunnilin in Faeroese, is 4.9 km long, of which 2.9 km is under the sea. It is a single-bore two-lane tunnel with a diameter of 10 m, with emergency parking places every 500 m on each side. The tunnel is bored entirely in basaltic lavas and associated volcanic rocks, although there has been no active volcanism or serious seismic activity since the Tertiary era. Pumps cope with water influx which is of the order of 150 litres per minute per kilometre, and are designed to cope with twice this volume. As a further precaution against flooding, or pump failure, there is a 50 m long reservoir below the lowest point in the tunnel, capable of holding 48 hours water penetration.

The tunnel was commenced on 28 September 2000 on Streymoy, and on Vágur on 27 February 2001, with breakthrough achieved early in 2002, and opening to the public in November that year. Journey times between the airport and the capital have been cut from about two hours to one. The Faeroese Post Office has issued commemorative stamps celebrating this civil engineering achievement in February 2003.

Source: *Postverk Føroya*.

From Paul W. SOWAN

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Underground Coal Gasification

Setting fire to coal seams as a means of extracting gaseous fuel has been used in Uzbekistan since the 1930s, and tried experimentally in Derbyshire in the 1950s and more recently in Spain. The method is again under consideration for application in the UK, offering the potential benefits of using our coal resources whilst avoiding the need to sink or work mines, or produce further colliery waste tips.

Source: ANON, 2002, No miners, no slag heaps, Geology Today 18(4), page 125 [quoting from an article by James Meek in The Guardian, 30 May 2002]

New Underground Dimension Stone Quarry Opened on Portland

Portland's first underground building-stone quarry (a limestone mine in current legal terminology) was opened on 25 August 2002. Two firms, Hanson Bath & Portland, and Albion Stone Quarries, are currently working Portland stone from opencast quarries, and Albion have now driven their Bowers mine from a portal in the rock face at the south end of their Bowers quarry. This will exploit a reserve of 7,500 cubic metres of stone, expected to last for five years. Work is planned to start on a second, larger, underground quarry at Stonehills (NGR SY 682705) in April 2004.

The mined stone blocks will have a maximum size of 7 tonnes, but larger blocks, when required, can be supplied from the Bowers opencast. The decision to go underground has been in response to environmental considerations. Vibration, noise and dust at surface will be reduced, for example, and the land surface itself preserved. Albion, also, have given up the use of explosives, below and above ground, and are using jet belts and wire saws to cut the stone. The openwork currently supplies 3 - 4,000 cubic metres per annum, and will remain in production.

Source: Anon, 2002, First limestone mine opens on Portland. Mining, Quarrying and Recycling, November 2002, page 4.

From Paul W. SOWAN

Italians open Nazi bunker to tourists.

A German World War II bunker hidden deep in a mountain near Rome is to be opened as a tourist attraction. The bunker is near Sant'Oreste, on the slopes of Monte Soracte, 20 miles (32 km) north of Rome. It was constructed from 1944 as a Nazi headquarters in Italy, under the command of Field

Marshal Albert Kesselring. Earlier tunnels in the volcanic rock were developed into 'ten-mile network of concrete passages and chambers.' Current plans are to make the tunnels safe and open them to tourists, and to develop derelict barracks at the site into a 'high-quality hotel and restaurant.'

Sad news

Geoff Cox, owner of Ecton Mine (a one-time member of the UK's National Association of Mining History Organisations, NAMHO) who in recent years did much to foster an interest in metal mining amongst schoolteachers and, through them, their pupils, died this morning in Macclesfield Hospital, after a long struggle against Parkinson's disease. A group were trying, with Geoff, to reinstate the position of Ecton as a centre where mining and minerals processing principles could be introduced, but today's news brings further uncertainty as to Ecton's future. Having known Geoff since we sat next to each other in "Determinative Mineralogy" in 1950 when we were together on the Mining Course at the RSM, I for one will miss having him around.

From Tony Brewis

Visit to Mysterly AAOR 17th Jan 2004

There is an official Sub Brit a visit to the former anti aircraft operations room (AAOR) at Mistley in Essex on 17th January 2004. Until a year ago this site was a museum. All the displays have now been removed but the building still retains many of its original features and is in good condition and is still lit and heated. This is a private visit for Sub Brit members and guests and is not a public open day and will be the last chance to see this bunker before it is sold and put to other uses. Dr. James Fox who was one of the trustees of the museum will be on hand to talk about the bunker and the recent move to RAF Holmpton. There will be an administration charge of £1. Refreshments will also be provided (tea/coffee/sandwich/cake) during the day at a cost of £3 per head.

The bunker will be open from 11 am till 4 pm, just turn up at any time during that period. There is no limit on numbers but places need to be *booked in advance*.

Please send a cheque for £4 payable to Subterranea Britannica to 13 Highcroft Cottages, London Road, Swanley, Kent.

The Mistley bunker is located at OS TM122313 in Shrubland Road, Mistley, and a short walk from Mistley Station and close to the B1352 Harwich Road.

Books

Cold War: Building for Nuclear Confrontation 1946-1989

By Wayne D Cocroft and Roger J C Thomas, edited by P S Barnwell. Published by English Heritage 2003. ISBN 1 873592 69 8, price £24.99. 281 pages, profusely illustrated with black and white and colour photographs and sectional drawings. In English language with a summary in English, French and German.

Most of us of a certain age will never forget October 1962 and the Cuban Missile Crisis: a time when the outbreak of a third world war seemed distinctly possible. This was one of many potential flash points of the Cold War, a time when the Super Powers waged a cat and mouse game of deception and fantastical missile programmes exemplified by MAD (Mutually Assured Destruction) and Ronald Reagan's Star Wars. Britain became an 'unsinkable aircraft carrier' and in Berlin a wall was built to protect, so the DDR stated, the workers' paradise from the noxious influences of the West.

The Berlin Wall has largely disappeared but in Britain many structures remain to remind us of this period now slipping into history. These range from the small Royal Observer Corps underground monitoring posts, Thor nuclear missile bases and the large Regional Seats of Government capable of accommodating an embryo administration during a nuclear holocaust. Until now comprehensive details of the many structures built by the military or civilian powers and their context has been lacking.

This new book grew out of a Royal Commission (later English Heritage) study of what remained of the structures built in the Cold War, and was founded principally on archaeological and architectural fieldwork. The structures surveyed also included those built by the United States on the 'unsinkable aircraft carrier' as part of their commitment to Nato: these were quite distinct designs. The many research establishment buildings built in connection with Britain's own attempts at designing an independent nuclear capability are also described. Summaries explain how the island's structures fitted into the context of the global conflict, and how this legacy fits into the international perspective.

The forward acknowledges the contributions from Subterranea Britannica, Fortress Study Group and other similar bodies.

Both of the authors work for English Heritage and will be known to many of our members.

This is a most handsome book, printed on good quality paper and profusely illustrated with interesting contemporary and current photographs: its price is extremely reasonable. The sectional drawings are particularly excellent. One could not imagine a better work on the subject.

From Bernard Lowry

The Maginot Line 1928 - 45

Author: William Allcorn Publisher: Osprey Publishing Pages: 64 illustrations: photos, drawings and diagrams in colour and BW ISBN: 1-84176-646-1.

Very often the question is asked: Is there a good book available about the Maginot Line in English? It is difficult to answer, but now it's not a problem any longer.

William Allcorn has written a rather detailed study about the Maginot Line in English. From his publisher he got 64 pages to fill with text, photos and drawings about, perhaps the most famous defence line in Europe before WW2. This publication with the title: "The Maginot Line, 1928-45" is published by Osprey and came out recently. I read this book and I must admit that the author succeeded to bring his subject to the public in a very clear style. I'd like to thank the author, because he has put the Maginot Line in the right context. He starts with an very extended description of the subject and not until on page 56 he comes with his conclusion: "Success or failure?". Regarding myself as an expert on the subject I find his conclusion and opinion very good, because he says: The Maginot Line did what it was designed for, but.....(read this conclusion for yourself).

In rather brief style, sometimes difficult to read, because Mr. Allcorn managed to put a lot of information on a little piece of paper such as the history, a huge amount of technical details and events that happened in 1940. As he mentions on page 41 he limited his subject to everything that was built until 1936 under the direction of the CORF, the commission that surveyed the construction of the greatest part of the Maginot Line. The fortifications, built by the field troops, called MOM (main oeuvre militaire) are not described. A part is devoted to the Alpine part of the Line, a part of the Maginot Line that is sometimes neglected. The author got a lot cooperation from experts on the subject; he even came into contact with A. Haas, a former officer who took a lot of photos during the phoney war and also during the fighting in 1940. A number of photos from his collection are published in this book.

The book is illustrated with photos in colour and BW, drawings, sometimes a little to artistic, plans and diagrams. Apart from some very minor details that are not quite correct, this book is certainly a must have for all those who want to have information about the Maginot Line in English. It is not a travel guide, but it gives the information one needs to visualize what was the Maginot Line and why it was built.

I hope this book will contribute to a more positive image of the Maginot Line.

From Hans Vermeulen - Member A.A.O.F.L.M. (Association Friends of Fermont)

Books

Secret Underground Bristol

Author: Sally Watson General details: Paperback, 245mm x 185mm, 128pp Price £14.95 + £1.00 post and packing from Moore Books.

This is a very nice book which the details of a mixture of very interesting underground features in the area. There are dedicated chapters for the following, Grottoes, Caves, Hot Springs, Clifton Rocks Railway, Corsham Wartime Citadel, Combe Down Stone Mines, Bristol Coal Mines, Sewers and Drains, Oddities and legends, Medieval Cellars and Conduits, the Frome and Castle Moat. Each chapter and description of features is supported with a mixture of colour and black and white Photos. Tony Robinson (Time Team and Baldrick fame) provides an opening forward in all this is a highly informative book produced in an pleasant style which both entertaining and interesting.

From Mike Moore

The Mine Explorer V (2002)

Author: various **Published:** 2002 **Publication details:** Cumbria Amenity Trust Mining History Society: iv + 176pp **Price / availability:** £ 9.50 + p/p from Cumbria Amenity Trust Mining History Society, The Rise, ALSTON, Cumbria CA9 3DB (T) 015394-32957

Abstract: This issue of *The Mine Explorer*, is possibly the biggest and best yet (issues 2 - 4 were published in 1986, 1989, and 1994), and contains reports of exploration, reports of historical research, reminiscences of former miners, and much else. A substantial and well presented volume, with a mass of information in rather small print, with numerous black and white photographs of surface and underground scenes, mine plans and sections, etc.

The individual papers are as follows:

- Peter FLEMING - The German copper miners at Coniston (pages 1 - 23)
- Adrian BARRELL - The Third Way (24 - 30)
- Ron CALVIN - Fans and pumps, Haig colliery 1966 - 1984 (31 - 36)
- Ron CALVIN - Lamp 184 - memories of Haig pit (37 - 38)
- On CALVIN - Inspection of stoppings, Haig pit, 1966 - 1984 (39 - 42)
- Jon KNOWLES - The exploration of Croesor slate mine (43 - 56)
- Warren ALLISON - The re-opening of Lucy Tongue level, Greenside mine (57 - 61)
- Anton D. CHENYLLE-PROCTOR-THOMAS - Furness mine & furnace proprietors: a register of mine and furnace proprietors with operations within the districts of Furness, Cartmel, and Millom (62 - 66)
- John HELME - Newland iron furnace, Part II (67 - 72)
- Ian MATHESON - Letters of John Barratt, 1824 - 1834 (73 - 79)
- Ian MATHESON, Dave BRIDGE, and Mark SIMPSON - Coniston coppermines survey, 1995 - 2002 (80 - 84)
- Mark SIMPSON - Caudale slate quarry (85 - 95)
- Dave BRIDGE - Frog shaft (96 - 116)
- Peter HOLMES - Haweswater aqueduct and the Mardale tunnel (117 - 119)
- Sheila BARKER - Hudgillburn mine (120 - 135)
- John BROWN - The re-opening of Grey Crag level at Coniston coppermine (136 - 139)
- Richard E. HEWER - The Kennecott copper mines, Alaska, USA (140 - 176)

There is an associated CD-ROM *A pictorial tour of the Coniston coppermines* available from the same address above at £ 12.00.

Collieries of South Wales: 2

Author: John CORNWELL **Published:** 2002 **ISBN:** 1-84306-017-5 **Publication details:** Landmark Publishing: 192pp **Price / availability:** £ 19.99 + p/p from Landmark Publishing, Ashbourne Hall, Cokayne Avenue, ASHBOURNE, Derbyshire DE6 1EJ (T)01335-347349

Abstract:

This substantial hardback volume, in the same style as the earlier volume, is a photographic record of 29 collieries, using over 200 photographs, many of which are of underground views. There is brief text and extended captions supplementing the photographs, and an index.

The photographs include surface buildings and plant, railways and rolling stock, drift entrances and shaft-tops, spoil tips, miners' housing, personnel, underground roadways and faces, and roadheaders and coal cutters. These are supplemented with some maps and mine plans. The collieries featured in this volume are Aberaman, Aberpergwm, Abertillery New Mine (formerly Rose Heyworth), Bargoed, Bedwas, Blaenavon ironworks early mining, Blaendare, Blaenserchan, Bwllfa, Cwm / Coedely, Cwmburgwm, Cymmer, Elliott, Ferndale, Glyn, Glyntillery, Hafodyrynys, Llanhilleth, Llanover, Mynydd Maen, North Celynen / Graig Fawr, Scotts Pit, St. John's, Taff Merthyr, Treforgan, Trelewis, and Ty Trist. There are sections on 'miscellaneous collieries,' landscapes of the Rhondda valley, South Wales coking works, coalfield housing, and steam locomotives.

Books

Great Orme Bronze Age mining and smelting site.

Author: Edric ROBERTS **Published:** 2002
Publication details: Current Archaeology 16(1)(181), 29 - 32. **Price / availability:** From Current Archaeology, 9 Nassington Road, LONDON NW3 2TX (T) 020-7435-7517 (F) 020-7916-2405

Abstract:

Article with colour photographs describing the archaeological investigation of mines at Llandudno. Documentary evidence indicates that copper was mined intermittently from 1692 to 1880, and that in 1831 and 1849 miners broke into older workings, the archaeological investigation of which is reported. Stone hammers, antler picks, and fragments of bronze are reported.

King's Standing transmitter station, Crowborough

Author: Ronald G. MARTIN **Published:** 2002
Publication details: Industrial Archaeology Review 24(2), 91 - 102. **Price / availability:** Maney Publishing (for Association for Industrial Archaeology), Hudson Road, LEEDS, LS9 7DL

Abstract:

This paper describes the history of the World War II black propaganda transmitter 'Aspidistra' and its construction, and the conversion of the facilities for use as a Cold War Regional Seat of Government. It is primarily an archaeological record, with measured drawings, of the several standing buildings remaining on the site.

It includes four photographs, a site plan, and six pages of measured elevations, plans, and sections. The original WWII transmitter was believed (at 600kW) to be the most powerful in the world at the time, and was capable of changing transmitting frequencies very rapidly. It was installed in a two-level underground bunker on Ashdown Forest, and retained an active transmitting rôle after the war. The WWII bunker, and associated surface buildings, were built in 1941/42.

In 1984-86 the bunker was gutted, and Regional Seat of Government 6 built within the old concrete box, with extensions, to replace the Dumpy Level facility at Dover. The bunker is now owned and used by the West Sussex Police as a training centre. Most of the surface buildings, recorded in detail in this paper, were at the date of survey redundant and derelict.

Britain's historic railway buildings An Oxford gazetteer of structures and sites.

Authors: Gordon BIDDLE **Published:** 2003

ISBN: 0-19-866247-5 **Publication details:** Oxford University Press: xxxvii + 759pp **Price / availability:** £ 60

Abstract:

This impressive volume records the 'most historically important or interesting' railway buildings (widely defined to include tunnels) of Great Britain (including the Isle of Man but excluding Northern Ireland.) It includes all those Listed as Buildings of special historical or architectural interest (over 2,000) with about 350 additional ones of interest selected by the author. Industrial railways and their structures are mostly excluded, as are preserved and heritage railways unless these included statutorily protected or especially interesting buildings. Although tunnels are included, primarily on the strength of their portals rather than their inherent interest or importance in terms of tunnelling technology, other earthworks are not, (although embankments at least might be considered to be buildings within the meaning of the legislation!)

There is an introduction on *The nature of railway buildings* which discusses bridges and viaducts (pages xvi - xx), tunnels (xx - xxi), stations (xxi - xxv), goods sheds and warehouses (xxvi - xxvii), signal boxes (xxvii), engine sheds (xxviii), hotels (xxix), and railway housing (xxix); also building materials (xxx - xxxii.) The Listing process is explained in page xxxiii. The gazetteer, arranged by 11 geographic areas, occupies pages 1 - 712, with at least one black-and-white illustration on almost every page. Several of the shorter sections in the book are similarly generously illustrated. Suggestions for further reading / sources of information cited are appended to entries. These are usually references to general works, Alan Blower's *British railway tunnels* (1964) for example, rather than more detailed studies of specific structures. There are regional maps shewing current and closed lines and the locations (except within Greater London) of gazetteer entries.

At the end of the work there are short sections on recent listings (pages 713 - 714), 'Some important losses' (715 - 732), engineers and architects (but not contractors or builders)(733 - 739), a very short bibliography of predominantly architectural works (740), an illustrated glossary of (mostly) architectural terms (741 - 745), and a comprehensive index (747 - 759.)

In such a monumental work, occasional errors are perhaps inevitable. Kenley Station (which is actually within the London Borough of Croydon) is credited to Surrey, for example. However, this is clearly an important and authoritative reference work for all concerned with the history and conservation of an exceptionally important part of the built heritage. The author makes the point that the number of Listed Buildings in the railway estate is exceeded only by those in the care of the Church of England.

Stone Quarries at Hosey Common and Westerham Kent

NEW DISCOVERIES AND A MEASURED SECTION

Hosey Common (TQ 4552) lies on the east side of the B 2026 road, about a kilometre to the south east of Westerham. It consists largely of young woodland which covers a shallow dry valley containing disturbed ground, numerous trackways, and an embanked causeway. In a west-facing eastern escarpment overlooking the valley is a series of entrances to underground building-stone quarries. Three distinct tunnel systems, which may once all have intercommunicated, have long been known, and gated as important winter bat hibernation sites. Kent Underground Research Group collaborate with bat specialists in monitoring the security of the bat gates, and have access outside the bat hibernation season.

DISCOVERY OF THREE NEW SETS OF QUARRY TUNNELS

During 2003 Paul Thorne, of KURG, examined the escarpment and trackways to the south of the then known underground systems, and opened a fourth one. During the course of a KURG field meeting on 3rd August a fifth system was discovered and opened, and since then a sixth has been found (and is thought to be the last.) Careful examination of the tunnels has revealed, to date, a puzzling absence of (potentially datable) clay tobacco pipe fragments, although bottles and glasses which seem to date from 1890s parties have been found.

DESCRIPTION

There are now six distinct areas of known tunnelling, of which the two northern systems are interconnected. From north to south, the northernmost four systems have about six, ten, three, and eleven approximately east-west galleries, the longest running into the hillside about 70 metres. The east-west main galleries in each system are interconnected by north-south cross passages. Three longer north-south tunnels link systems 3 and 4. The entire extent or interconnectedness of the entire group of tunnel systems is not fully known as in places tunnels are currently blocked by roof-falls.

The tunnels are high enough to stand upright in wherever the floor is exposed, although throughout much of the system large quantities of rejected material left underground makes hands-and-knees crawling necessary for any extended exploration. Clear passage dimensions (ignoring the quarry waste) are up to eight feet wide and seven feet high. A short description and plan has been published in *Kent and East Surrey Underground* by members of the Kent Underground Research Group.

GEOLOGY

All the tunnels are driven eastwards from the escarpment into the 'rag and hassock' beds of the Hythe Beds formation. Two superficially dark brown beds of a sandy variety of Kentish Rag appear to have been quarried for local building purposes, one at floor level and the other midway up the working faces. The dark brown colour proves, on closer inspection, to be iron staining on joint faces. Breaking the rock reveals the green-grey specked true appearance of the material.

Between and above these beds of hard stone are yellowish beds of loose rubbly sandstone, the source of the large quantities of quarry spoil left underground (the 'hassock'.)

Although, in its main area of production around Maidstone, the Kentish Rag is a limestone, the beds become progressively more sandy westwards along the outcrop, and at Westerham are probably essentially sandstone or calcareous sandstone.

ARCHAEOLOGY

Examination of a section in the newly opened system 4 on 3 August 2003 revealed a smooth floor with no trace of sledge or wheel ruts, a floor-ceiling height of 1.8 metres, and a gallery width of 3.2 metres.

The following section was noted ..

Bed	Superficial Colour	Thickness Meters	Notes
5	Brown	0.3	Top bed, nodular and rubbly, soft, with prominent wedge marks 4 cm wide and up to 11.5 cm long (The ceiling is characteristically knobly)
4	Yellow	0.55	Nodular, sandy with narrow tool marks
3	Orange/ Dark Brown	0.2	Tough compact stone with superficial iron staining and widely spaced long slanting narrow tool marks
2	Yellow	0.4	Resembles (4)
1	Dark Brown	0.35	Resembles (3)

Presumably beds (1) and (3) are the ragstone for which the quarry was worked, and beds (2), (4), and (5) the hassock left underground as quarry waste. The extensive deposits of quarry spoil throughout the system prove, on inspection, to support this

Stone Quarries at Hosey Common and Westerham Kent

interpretation. This implies that only about one third of the material excavated was taken out of the quarry for use. The overall extraction ratio is thus exceptionally low for an underground building-stone quarry (extraction ratios up to 75% are commonly seen in good underground limestone quarries.) As both paying beds are extensively fractured, it appears that only occasionally could blocks of stone larger than about eight or ten inches be secured. At least one now empty post hole was seen in a spoil bank. The tunnels are driven at a large angle to the predominant jointing orientation. There are several large gulls (open to a height of two metres above ceiling level in places) at a shallow angle to the joints, and approximately parallel with the escarpment, and at one point a fault with a downthrow of about 0.3 metre. In some places the ceiling has failed, revealing an overburden of up to 1.3 metres of hassock.

HISTORY

No historical record relating to the quarries has yet been found, other than the large scale plans of the Ordnance Survey. The surveyors' drawings, made in 1798, shew what was then called Westerham Common, but no trace of any mineral workings. The first published OS one inch to one mile map in 1819 also fails to shew any sign of mineral extraction. The first edition published large scale OS plans, surveyed in 1868, mark the northern end of the site as a quarry and the southern end as a gravel pit. By the second edition, of 1910, the label had been amended to 'Old quarry.' This suggests an early or mid-nineteenth century date for the start of quarrying here.

There is no entry for Hosey Common in the comprehensive list of stone quarries and other such works in Robert Hunt's *Mineral statistics* for 1858, published in 1860, but as his Mining Records Office was primarily concerned with coal and metalliferous mines it is hardly surprising if he and his small staff overlooked an obscure country quarry in the Weald. Following the passing of the *Metalliferous Mines Regulation Act*, 1872, underground quarries (legally mines) such as these became subject to Government inspection and regulation. Kent and adjoining south-eastern counties were added to the existing Manchester & Ireland mining inspection district. However the Inspector of Mines, Joseph Dickinson, appears to have taken very little interest in this addition to his territory, with the exception of the new deep shaft gypsum mine opened in Sussex in the mid 1870s, and some brief notes on some workings in Surrey in 1886. Kent was subsequently moved into the North Wales & Isle of Man mining inspection district, under Clement Le Neve Foster as Inspector. Foster had some years previously conducted some geological field work in the Medway valley, so was

clearly familiar with Kent. He was also a very thorough inspector, and appears to have tracked down almost all active mines in the south east during the 1890s, although his lists and report contain no mention of Hosey Common.

CONCLUSIONS

Although the quarry tunnels are surprisingly numerous and extensive, they tend to give a false impression of the volume of stone taken to surface, as at least two thirds of the material excavated appears to have been left underground as unusable quarry waste. Even in terms of total material excavated as a fraction of stone *in situ* the extraction ratio is low, as the pillars are wide with few 'eyes' between the stalls. There was no rail transport option for taking stone away from Westerham until a branch line was opened to a terminus on the far side of the town in 1881. The stone was almost certainly all used locally. The quarries were probably worked in the middle years of the 19th century, and closed as a going concern by the 1890s. The only likely sources of documentary evidence are probably local estate papers or the accounts of Westerham's 19th century local government bodies, especially those relating to the upkeep of roads.

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Paul W. SOWAN

World War III and Merchant Shipping

It is interesting to note that although civil defence in the United Kingdom has to all intents and purposes been delegated to dusty old store-rooms, this is not the case with Merchant Shipping under the UK flag. In 1997, The UK government through the Department of Transport considered that as far as defence is concerned, UK Merchant Shipping is required for:-

- Transatlantic reinforcement of Europe.
- The reinforcement of Europe from the UK
- The direct support of the Royal Navy
- The civil supply of the UK and Europe in times of tension and war.

In the master's safe of each UK flagged merchant ship, will be found a war envelope with the following written on the front :- "Only to be opened in the event of :-

- Outbreak of war between two or more of these countries :- United Kingdom, United States of America, Commonwealth of Independent States, Ukraine, Bello-Russia, People's Republic of China, Federal German Republic and France.
- Occupation of the United Kingdom by any foreign power.
- Major civil unrest within the United Kingdom resulting in an overthrow of legitimate government control."

The contents of this envelope is obviously restricted, though many UK flag ships also carry two Files published by NATO known as the Allied Guide to Masters. During peacetime, these files are made available to officers in order to study them and be aware of their contents. Volume one contains guidance on how the vessel should prepare for a war (conventional or nuclear) and actions to be taken in the event of being attacked or captured. Volume two contains precise details of convoy manoeuvres and anti-submarine manoeuvres. Volume One contains a wealth of information and I've included some of the more interesting snippets below.

Initial Procedures

- Upon receiving a warning message over the MERWARN system, the following should be carried out.
- Contact Admiralty as prescribed with details of vessel's position and intended destination, course and speed and estimated ETA.
- If ordered :-
 1. Take anti-sabotage precautions
 2. Follow a given route through the MERZONE
 3. Carry out a zig zag

4. Take the necessary steps to conceal the ship's movements
5. Maintain radio and/or radar silence
6. Darken ship and proceed without navigation lights
7. Report all hostile warships, aircraft, merchant ships and submarines.
8. Do not use false colours and disguise. For example, showing neutral colours, altering the appearance of the s h i p , changing the name or port of registry or concealing of defensive armaments is forbidden.

Secrecy of Position and Information

- Ship's position should be known ONLY by Master, Chief Officer and Officer of the watch. Courses drawn on the chart should be ruled faintly and erased when no longer required.
- Destroy all navigational calculations after use.
- Do not discuss with any crew member details of vessel's position or movements.
- No private diaries may be taken to or kept whilst at sea,
- Encryption equipment will be supplied to all ships. This MUST be used when sending information concerning route instructions, convoy arrangements, assembly points, escorts or movements of warships, nature of cargo and arrival or sailing dates.
- Crew should be warned before going ashore not to discuss any aspect of the ship's operation. Enemy agents frequent ports world-wide. They may take the form of messengers, waiters, bar tenders, women or casual acquaintances.

Security of Classified Documents

- Each ship will be provided with a metal box, perforated and fitted with a strong lock. This is fitted on the bridge so that it can be detached and thrown overboard. All classified documents, when not in use should be stored in this. A similar box is provided in the radio room as are weighted perforated bags.
- In port, all documents should be transferred from the boxes into the ship's safe.
- Ships may also be supplied with weighted book covers. All cryptographic aids should be kept in these.
- The SECRET log will replace the deck log book. Deviation book must be classified SECRET.
- In an emergency, destruction of classified material should follow the sequence below :-

World War III and Merchant Shipping

1. Cryptographic material, including crypto equipment.
2. Merchant ship secure callsigns.
3. Recognition and identification signals.
4. Other classified material.
5. Other official documents (used navigational charts etc).
6. Ideally, shred or burn paper material. Ideally, do not jettison materials in less than 100 fathoms of water. If this is necessary though, do not let the enemy witness the jettisoning.
7. Destroy crypto equipment by removing parts, including printed circuit boards, cut internal cables and then smash the remains with a sledgehammer. Scatter pieces over as wide an area as possible.

Scuttling the Ship

- Scuttling may be necessary to prevent and out of control fire reaching magazines or hazardous cargo or be necessary to evade enemy capture.
- Activate scuttling equipment if fitted if capture seems imminent. If no equipment, manual scuttling must take place in such a way that it cannot be reversed by a boarding party. Ensure crew realise that scuttling charges are absolutely safe until the detonator is inserted.
- Carry out the following actions :-
 1. Stop the main engine. If a steamship, let off steam from boilers and blow boilers down where practicable.
 2. Close main and auxiliary sea inlets temporarily.
 3. Smash inlet pipes at convenient positions near sea inlet valves. Then, open sea inlet valves sufficiently to ensure a full flow of water. Bend over valve spindles with large hammer to ensure they cannot be closed again. (ensure bilge covers easily accessible during normal shipboard operations).
 4. Immobilise main engine by putting sand (or similar) into any accessible bearings, particularly the thrust bearing.
 5. Smash machinery as time permits.
 6. In tankers, never allow the cargo to fall into enemy use. Render all hoses and connections unfit for use.

Rescue and Distress

1. Exercise extreme caution when picking up survivors. Lifeboats may be decoys for submarines.
2. Always give rescued survivors a replacement lifejackets as ships have been known to be

torpedoed whilst survivors lifejackets are drying.

3. If it is not safe to render assistance, inform an allied warship as soon as possible.
4. If rescuing enemy survivors, take extreme care. Bring them on one at a time. Search them immediately for arms (being covered with a man with a rifle). All crew should be ready on deck ready to overcome any resistance offered. Keep survivors away from each other to stop them forming an escape plan or an interview narrative. Keep them locked in one or more compartments from which escape cannot be made easy.

Missile Attack

There is little a merchant ship can do to protect herself from a missile attack, but damage to the ship can be reduced by the following:-

- Missiles may be launched from distances measure in hundreds of miles, by surface warships (including fast patrol boats), submarines and aircraft. The missile has the performance characteristics of a small, very fast aircraft; it may use its own radar to home in on a ship or it may home in on the ship's own radar/radio transmitters or infra-red emissions e.g. heat from the funnel. 3rd party information may be used.
- Advanced warnings are difficult to give. Watch out for evidence that the ship is under surveillance from either aircraft or surface vessels. Watch out for low flying helicopters near the horizon and be aware that the launch of a sea skimming missile is accompanied by a visible flash and smoke.
- Visual all round lookout should be maintained and particular attention given to the horizon and 5 degrees above it.
- Maintain a continuous radar watch as there is chance of detection of aircraft or missiles "popping up". It is unlikely though that navigational radar will give an early warning.
- Detection of the actual visual missile is difficult until the last moments of flight when the motor smoke trail may be visible.
- Once under missile attack :-
 1. Reduce the radar echoing area to the launching vessel to reduce the chance of the ship being targetted.
 2. Turning towards the attacker has the result of limiting the effect of the missile, since an angled impact is less likely to penetrate than an impact at 90 degrees.
 3. Present the least vulnerable part of the ship to the attack to limit subsequent damage.

World War III and Merchant Shipping

4. The main hazard is likely to come from fire, caused by either the warhead explosion or by the unburnt fuel from the missile motor.

In the event of a nuclear attack, convoys are to disperse on warning to a separation margin of not less than 3 miles from the nearest vessel. A plastic template is provided to all vessels to plot subsequent fallout.

The entire system for naval control was given a massive overhaul in 2001 and there now exists a more modern system taking into account new advances in technology, the introduction of GMDSS equipment and the probability of future conflicts being far more localised. Many of the old cold war rules

and regulations have been relaxed now and a British Captain is no longer required on a British Merchant ship unless the ship is classed as a strategic ship (passenger ship / cruise liner, product tanker or large trawlers).

During the first Gulf war, the MoD chartered ships for 144 voyages to and from the Gulf and UK ships accounted for only 11 of these. Since the Falklands conflict, the number of seafarers serving in British ships has fallen from 54,000 to less than 24,000. In addition, there are no more than 10,000 officers in the UK merchant navy. It is estimated that a future crisis would require up to 15,000 officers to ensure secure and reliable shipping. We can only hope this situation never arises.

Lee Higson

Godstone Mines Sub Brit Visit Report

There are four extensive underground quarry and mine tunnels systems at Godstone, all currently accessible. The entrances are locked, and access (outside the winter bat hibernation period) can be arranged with members of the Wealden Cave and Mine Society, who hold keys. Arch quarry, west of the A22, can only be reached via a deep shaft, using SRT or a wire ladder. The 'main' or Godstone Hill quarry lies under the road, and to the east. Eastwards beyond that are Carthorse quarry, and then Marden quarry / mine. In between Carthorse and Marden, and beyond Marden, there are other short sections of more or less collapsed tunnel, and numerous crown hole collapse features. Collapses also appear from time to time in nearby fields.

Two of these underground mineral workings in the Upper Greensand of east Surrey were visited by a group of Subterranea Britannica members, under the leadership of Nick Catford and Paul Sowen (of WCMS), on Saturday 5th July 2003. This was a Subterranea Britannica 'fringe' event, that is to say one of the many arranged privately between members, rather than a 'core' event arranged centrally and advertised by mail to all members. Attendance at 'fringe' visits is at the discretion of those organising these visits, but members at large are generally welcome to join in subject to places being available. Fringe visits are advertised electronically. Those, like your chairman, who do not have Email access can find out what visits are in prospect by telephoning John Burgess on 01590-677695.

The following notes summarise what was said and shown during the visit.

The several distinct series of underground mineral workings in the Upper Greensand either side of

Godstone Hill (the A22) at Godstone, which are currently accessible, or have been accessible at some time in the last century, are all entirely man-made mines or underground building-stone quarries, some of them to some extent later used as hearthstone mines, mushroom farms, or World War II Natural History Museum or wines and spirits stores. These tunnels, commenced as underground building-stone quarries, appear to have been started in the 17th century. Much older underground quarries, substantially medieval and perhaps even to a small extent pre-Conquest, are to be found further west, in Chaldon, Merstham, Gatton, and Reigate. Late Saxon work at the pre-Conquest Westminster Abbey, and in some Surrey churches, points to early quarrying in east Surrey. The Domesday Book survey of 1086 records two quarries in Limsfield manor, which are probably represented by parts of the 17 km tunnels network at Merstham and (pre-1933) Chaldon.

Products

The material extracted has usually been described as a calcareous sandstone, although the very low content of detrital silica, and the low calcite content, make this an inappropriate term for the rock. The greater part of it is in the form of chemically deposited microscopic 'lepispheres' of silica, with some biogenic calcite fragments, and very fine-grained clay minerals, muscovite mica, glauconite, etc. The rock has a very high porosity. Its poor weathering qualities are a result of the porosity, and of the unusually large degree of expansion and contraction on wetting and drying. An early 19th century source says it should be kept 'always wet or always dry.' As

Godstone Mines Sub Brit Visit Report

a freestone, very easily carved, it was valued in the Middle Ages especially for fine ashlar work, and ornate carvings, and is (or was) found in almost all the most important buildings in London and the Home Counties, although all this ancient fabric was almost certainly from Chaldon, Merstham, Gatton and Reigate - not from Godstone. The rock quarried or mines, or variants of it which are currently the subject of research, has been used for three purposes ...

Building-stone ... it may be seen in nearby houses, and in buildings and boundary walls in the village ... worked as rectangular blocks or slabs ... it is emphatically *not* a good building-stone, and Godstone as a place-name is *not* derived from Goodstone;

Refractory stone ... known as 'firestone' ... used in chimneys, ovens, lime-kilns, etc, and as hearthstones... (i.e. stone hearths) ... worked as rectangular blocks or slabs;

Mineral pigment ... known as 'hearthstone' and used to whiten stone flag floors, hearths, steps, etc., ... worked as rough broken lumps ... in the 19th C these were sold and used as rough lumps, but later the material was ground and mixed with small quantities of other materials such as cement and moulded into blocks ... or sold as step-powder in sprinkler-cartons.

Quarries or mines?

Parts of the workings can therefore best be described as subterranean building-stone quarries or quarries for blocks or slabs of refractory stone for furnace beds and linings etc (from Latin *quadraria*); other parts are better described as hearthstone mines, from which small broken lumps of stone (including previous quarry waste) were taken for manufacturing hearthstone blocks, step-powder, and the like. Archaeological evidence can be demonstrated underground to illustrate the different techniques used in extracting stone for the several purposes.

Certain beds, only, appear to have been of an appropriate quality, such as resistance to weathering, for use as a building-stone. This resulted in large volumes of quarry waste, which will be seen backfilling worked-out galleries, and walled-up behind dry-stone walls. Quarried areas have very smooth pick-marked walls, and much waste.

It seems likely that *all of the stone* would make saleable hearthstone, the only waste left in this case being those pieces containing chert nodules. Hearthstone mining removed much former quarry waste, creating much more open areas. Where hearthstone mining took virgin stone, much more irregular mine walls and working faces are seen, characterised by wedge-marks rather than smooth picked surfaces.

Quarrying and mining technique

The tunnel systems have been made by the 'pillar and stall' technique, the 'stalls' being the long parallel tunnels from which stone was extracted, up to 300 metres long and four metres wide, although usually not high enough to walk in upright. The intervening pillars of rock left in place to support the roof are of the order of three metres wide. Cuttings-through from stall to stall (called 'eyes' in Surrey) have been made at frequent intervals, to take more rock, but are often back-filled with quarry waste, as are the whole or parts of numerous stalls. The stalls were driven, for safety and maximum retrieval of sound building-stone blocks, at right angles to the rock joints system, and slopes downwards following the dip of the strata (about 7° approximately northwards) until further development in that direction was prevented by the table in the form of wet rock and a liability to flooding. The quarrying was carried about 200 metres beyond the floodwater levels recorded after especially wet winters. Alternate wetting and drying of the support pillars, which has weakened them, and small-scale anticlinal and synclinal folding, has led to large numbers of roof falls. Such roof falls are thought to be rendered more likely after flooding as a result of the increased weight of waterlogged rock, and the lubrication of joints in the roofstone. The quarrymen's and miners' technique of cutting eyes from stall to stall along joint planes has been another contributory feature to instability.

Two unusual features of the Godstone Hill quarry layout are the occurrence of second-generation tunnels cutting across the earlier rectilinear pillar-and-stall layout, and the presence of tunnels obviously (as evidenced the the directional pick-marks) worked up-dip as well as down-dip.

Secondary uses

On cessation of mining or quarrying, large areas of some of the workings were used as underground mushroom farms. It is thought that ventilation shafts, and much whitewash on the walls, date from this period, c. 1890s to 1930s. Some of the workings have also been used during World War II (1939 - 1945) as bonded stores, and as places for secure storage of hospital and museum specimens. Hearthstone mining and mushroom culture led to radical rearrangement of the underground galleries, which are now archaeologically quite complex. Early 19th century quarrying, and later working, have left iron plate-ways and narrow-gauge railway lines in places. At least some of the iron tramway plates are re-used from the Croydon, Merstham & Godstone Iron Railway of 1805 - 1838 (which never got beyond Merstham!)

Dates

Although the Godstone Hill quarries lie either side of

Godstone Mines Sub Brit Visit Report

(and below) a Roman road, and although an Act of Parliament of Elizabeth I's time relates to the upkeep of the road for the traffic in iron from the Weald to London, there is no evidence for stone-quarrying at Godstone before the 17th century. Much older quarries (including two noted in the 1086 Domesday survey) at Chaldon, Merstham, Gatton and Reigate, to the west, were important sources of stone for all the most important buildings of Medieval London and the Home Counties. Sir Robert Clayton [1629 - 1707] bought the Marden estate in 1672 (and Blechingley in 1677) and perhaps first developed the quarries at Godstone.

During the 1880s quarrying and mining was carried on for all three products. Latterly, at Marden (to the east) hearthstone was the only product, the last mining being undertaken opencast in the 1950s. The last Surrey mine to cease work was the Colley Hill hearthstone mine at Reigate, about 1960. Hearthstone has also been mined at Brockham and Betchworth.

Geological and hydrological points of interest

Stratigraphical and petrographical distinctions within the several beds represented within the c. 1.55 metre height of the workings are subtle and often not easy to detect, although there does seem to have been a crucial difference between good building-stone and other rock. The Upper Greensand building-stones, poor as they are, are unique amongst British building-stones. Another point of interest is the groundwater regime, and the question of interconnection between the Upper Greensand and Chalk aquifers. There is no simple link between the floodwater levels in the quarries and the Caterham Bourne, an intermittent stream which flows in the nearby Caterham valley (followed by the A22) in and after very wet winters.

The sites visited (1) Godstone Hill

We visited Godstone Hill quarry (which lies below and east of the A22) via the Roman Road entrance, and saw how the quarry tunnels crossed a small fault with a downthrow of about 1 metre to the north; this fault can be traced through the workings. Early 19th century iron plateways were shewn, and plateway junctions and continuation rutways. Also traces of later narrow gauge edge railways. We looked at the springs and evidence of recent flooding, and several former drift entrances (now blocked or sealed) under the A22. Most of the tunnelling had been for building-stone or for slabs of refractory stone for fireplace or furnace beds, but some large open areas were seen where it seems likely that the otherwise voluminous quarry waste had been removed by secondary mining for use as hearthstone (a step-whitening agent.) Mushroom ridge beds, albeit much trampled, were also seen. There was much discussion of marks on pillar corners which many believed to be rope-worn grooves, until closer inspection made it clear they would have been very peculiar ropes!

These are now interpreted as whipple-tree grooves look up meaning two for whippetree in volume XII of the *Oxford English Dictionary* for further enlightenment!)

The sites visited (2) Marden

Marden, to the east of Godstone Hill, is partly mine and partly building-stone quarry. The archaeological evidence for the distinction, in the form of the different tool marks and waste stone characteristics, was demonstrated. The 'quarry' area had been cleared and isolated by security doors for use during WWII as a wines and spirits store. The hearthstone mine area, largely in a state of collapse, is laid out on a different plan and adjoins to the east. Some members went to look at further bits of iron plateways, whippetree grooves, and / or the base of the 75 ft deep air shaft.

The underground visit was followed by a surface work, during which large numbers of crown hole collapse features were seen.

Safety

In both workings, great care should be taken not to touch the more obviously unstable areas of quarry walls and ceilings. WCMS have placed danger warning tape around some areas.

There have been numerous major roof falls in Godstone Hill quarry over the years (some have been cleared and evidently occurred during the working life of the quarry), and including several during the last 30 years. The roofstone in Marden is particularly hazardous.

Further reading: the most readily accessible published accounts are ...

Peter M. Burgess, 1994, Carthorse quarry, Godstone. Survey and site investigation 1990-91. *Bulletin Subterranea Britannica* 30, 21 - 34.

Peter M. Burgess, 1994, The use of plate rails in the Godstone firestone quarries. *Proc. Croydon Natural History and Scientific Soc.* 18(4), 102 - 107.

Paul W. Sowan, 1976, Firestone and hearthstone mines in the Upper Greensand of east Surrey. *Proc. Geologists' Assoc.* 86(4), 571 - 591.

Paul W. SOWAN

2003 Bunker Tour East Germany

If you read my report on the Berlin Bunker Trip that I managed to add to a work visit in late May, you won't be surprised to hear that a group of us went back in September for part 2...

To be honest, the 'reason' for the trip was - basically - because Dan McKenzie and I (Tony Page) had been offered entry into a former WW2 (my interest) and NVA (Dan's interest) bunker in Halberstadt, eastern Germany. I have been researching and visiting/getting into the various former WW2 underground weapons factories built by the Nazis for years, and Halberstadt was on the list.

Wilm Wolf, a German admirer of Dan's excellent website (www.bunkertours.co.uk) had contacted us and indicated he could get us in 'various sites' on my list. I got on the case and we exchanged info, and

would suit maybe two cars.

So, eight of us arrived at Berlin Schonefeld airport very early in the morning Monday 22nd September, collected two rental cars, and rocked up to Zossen-Wunsdorf, some 20 miles south, to meet Mike Barton.

Dan, Robin, and I had been all through the Zossen-Wunsdorf 'Zeppelin' bunker in May, but the others had not. (See issue two of Subterranea for the full report). This time, Nick Catford would take sufficient photographs to fully document both the bunker and the above-ground buildings as previously described in Subterranea, with the rest of The Team.

As The Usual Suspects arrived Herr Bochert, the chief guide for the site, immediately recognised us, and having previously come to the conclusion that we

were not your average tourists and that we were all genuinely very interested in the whole site, simply gave Mike Barton the keys to the complex and told us to 'help ourselves'. Ideal! Game On.

After the bunker had been photographed fully, we then basically did a re-run of the last visit to the beautiful 1930s buildings, with Nick and the others taking photos. After leaving Zossen-Wunsdorf, we drove the 30 miles south west to Jüterborg, and our hotel for the night.



Bomb Store on the Airfield at Jüterborg Photo by Dan McKenzie

Halberstadt came up. I'd had an interest in this massive underground former Junkers jet engine factory complex for years, but it had been tightly controlled by the authorities due to its continued military status. In an earlier, different, life, I had been aware of its GDR NVA use - a huge military storage facility.

Anyway, Dan, Robin Ware, and I had originally planned to travel out specially to get into Halberstadt, and told Mike Barton. (Mike is a Sub Brit member, living in Germany, whose name should be familiar to all by now, as he has arranged various excellent Bunker Tours in Germany...) Mike was dead keen to come, and then gamely offered to "also arrange a few days worth of sites" should we be interested. Should we be interested? Mike emphasised that this was not going to be a full-blown Barton-Tour-Special, but

Tuesday we went to a former WW2 and then Soviet airfield at Jüterborg. A local enthusiast, Helmut - one of Mike's contacts - had bought a section of the airfield and intended to make it into a museum. His area of this (huge) former Soviet military airfield was a Quick Reaction Alert Area, possibly housing two MiG 21 jets. There were two hardened shelters, big enough for bombed-up aircraft, an operations building and loads of utterly useless old military junk. But then I suppose people look at some of my 'restoration project vintage motorcycles' and write them off as 'junk' too...

There were a few roadworthy ex-NVA and Soviet vehicles, including a BTR-60PB armoured personnel carrier (APC) which had been rescued from the local training area. One of the former hardened shelters had been turned into a very neat house, where

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Helmut now lives. He also had acquired the nearby pilots' alert rooms, which contained more of his collection, which he was in the process of turning into a museum together with Manfred, our guide for the very full day.

We moved on to inspect various munitions bunkers dotted around the vast site, including the fighter control bunker spread over several levels. This originally WW2 Luftwaffe bunker was particularly interesting as it contained lots of abandoned equipment, including paperwork. We found a postcard from a Russian parent to her conscript son wishing him a happy May 1st, various radar print outs (dated 1983), and various programming cards. The bunker was somewhat stripped and basically trashed, but nevertheless very interesting.

That afternoon we drove out into the vast Jüterbog training area to the north of the airfield. This is now a huge nature reserve and not normally open to the public, but Manfred had obtained special access rights for us. Access to the site is banned due to the amount of unexploded ordnance littered around the place. This former training area really was massive. We drove some considerable distance down unmade tracks to various areas within it. There were two

areas we were particularly interested in: a tank range, and some WW2 Czech-style bunkers built in the mid 1930s in preparation for war.

The abandoned and derelict tank firing range was very interesting. It was a live-firing range, with a difference. The tanks, and APCs (Armoured Personnel Carriers), had stood in the specially constructed open-fronted building at one end of the range, but on plinths which could be moved to simulate the tanks being driven over rough terrain at speed. Some of these plinths were moved by electric motors; some by teams of squaddies physically muscling them by hand! The tanks were apparently fitted with a rifled tube down the barrel, enabling a much smaller round to be fired at the given target. In fact, Mike Barton told us that normal rifle ammunition was used, the standard 7.62 mm Kalashnikov round, which enabled the tank gunners to blaze away at

considerably less range than a tank's more usual formidably long range. To be honest, the whole set up looked really naff, and I was struck with thoughts of Disneyland and Universal Studios - where groups of both adults and kids would sit in the 'Back to the Future' ride and through the marvel of modern technology be thrilled to bits by rapid, immediate, high speed movement capable of yanking their spines out of place, whereas somewhere in the crumbling Socialist Dream, a bunch of sweating soldiers were heaving a 30-ton tank backwards and forwards on a plinth to enable the defenders of the anti-fascist doctrine to practice their aim. Incongruous scene, don't you agree? However, it did work, and was adequate.

From the tank range, we drove for 20+ minutes on



Tank Artillery Range at Jüterborg Photo by Dan McKenzie

soft sand and cobbled tracks through trees and over heathland to find a command post training bunker tucked away completely hidden in the trees. It was clear that the bunker, like many others in eastern Germany, had been used in the past by the local youths for discos and parties, but it is beyond belief how any of the revellers found their way home afterwards as it is so far from anything that can be classed as a distinguishing landmark. We had the benefit of Manfred who knew the area, and I can only assume that the party-goers each had a GPS unit and an overwhelming desire to be at the party. As we moved still deeper into the training area we began to notice suspicious lumps of metal close to, and in some cases on, the track. Further, somewhat nervous, investigation revealed these metal objects to be shells, bullets and worse...

We headed out to various WW2-constructed bunkers

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built to replicate the Czech bunkers the Germans presumably had already planned to attack. The Germans basically attacked these bunkers to learn just how to finish them off. The bunkers showed evidence of a severe pounding, as they had been subjected to various demolition attempts before, and during, WW2. These bunkers were full sized replicas of the Czech bunkers. Time Spent in Preparation is Seldom Wasted, after all. After we'd checked out the Czech bunkers, we drove to Halberstadt, a long drive of 130 miles to the west, on local roads, for - in my case - the Main Event.

Visiting this huge underground former Nazi weapons manufacturing plant has been on my list of things to do for years. It is another vast underground bunker, tunnelled out by luckless concentration camp inmates

Codename - 'Malachit'. A huge 60,000 cu metre bunker at Thekenberg, near Halberstadt / Langenstein. Constructed during WW2, using concentration camp (KL) labour, this large (around 13km of tunnels) underground factory was used by the Junkers company in the manufacture of jet engines for aircraft. Only the western half of the installation appears to have ever fully finished. Railway line and road entry with various entrances (at least five).

Codename - Makrele 1. Old mushroom-caves; again, an installation for Junkers. Located near the Zoo, the system is completely blasted (by the Russians after WW2) but some areas are still accessible. Not a large complex.

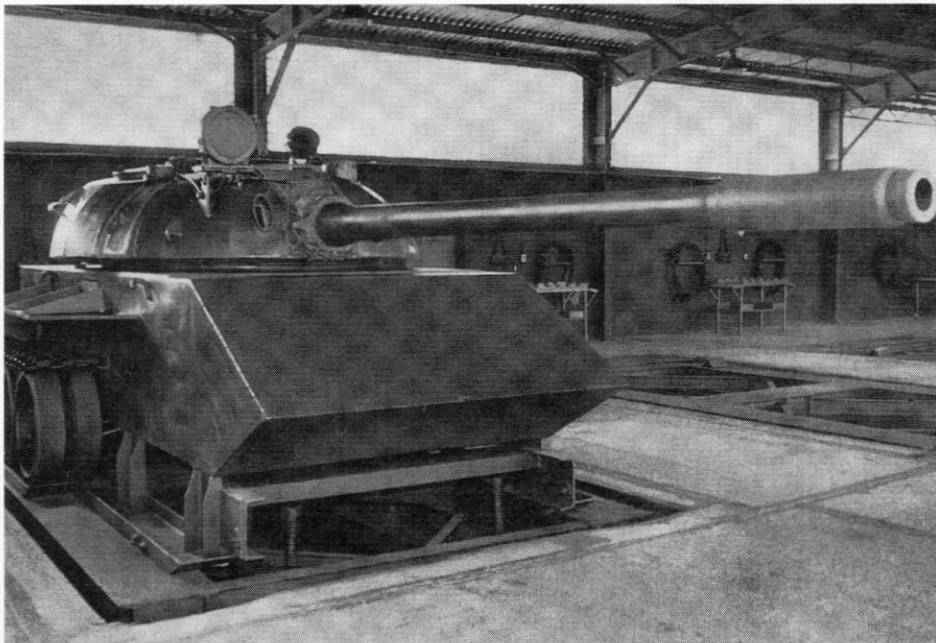
Codename - Makrele 2. Junkers too. Now privately owned. Not large.

Lange Höhle (Long Cave) Was reserved for the storage of art treasures (not sure whose!) and used as a Junkers store. This is an old mine (in white sandstone) and is now privately owned.

All the excavations are WW2. Three of them were blasted by the Russians just after the war, but are apparently still accessible.

Our visit to the area was confined to the large, actually huge, bunker 'Malachit'.

Arriving at 0800, we waited by one of the entrances to the heavily fenced area. It was obviously a former GDR base, as shown by the serious fencing, and military buildings. Now apparently



Archive Photo of fixed Tank Artillery Range

(many of whom died in the process) to provide a manufacturing area safe from the relentless bombing by the RAF and USAF. After Peenemünde was bombed by the RAF, after WAAF Central Photographic Interpreter Constance Babington Smith 'didn't like the look of ' some strange rocket-like structures photographed by reconnaissance aircraft, Hitler ordered all secret weapons plants to be placed under the control of the SS and to be placed underground - safe from both the prying eyes of Ms Smith, and her chums in the Lancasters. The problem was, there simply weren't enough underground places available. So they were built...

One such place was Halberstadt.

The Halberstadt area, in the words of a local historian, is "overcrowded with WW2 excavations". My investigations lead me to believe that there are at least four separate excavated areas:

These are, or certainly include,:

deserted, well at eight in the morning anyway, the scene didn't give rise at all to the suspicion that behind the wire was one of the larger underground factories in Germany. The only giveaway was perhaps the huge mountains of spoil around 3kms away. As we waited for our guide, I noticed a mapboard and walkers signs indicating a WW2 concentration camp memorial 2.6km down the track. I was keen to investigate, but our guide was due at 0830, so there wasn't really time. Mike later said that at the memorial there was also a little museum and KL site, with evidence of about eleven barrack sheds. A repeat visit then...

In the book "Decknamenverzeichnis deutscher unterirdischer Bauten des zweiten Weltkrieges" [List of Codenames of Underground Constructions from WW2] (Hans Walter Wichert, ISBN 3-9803271-4-0) there are various mentions of this former Nazi plant, complete with a map drawn by the US Combined

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Intelligence Objectives Sub Committee. (file no. XXXII - 17). It states that the complex, hewn out of the sandstone, was occupied (western half) by the Junkers company for the manufacture of jet engines. The map clearly shows planned but not constructed tunnels too, so presumably it was made from German documents recovered. It also shows that some tunnels were finished, floored and lined, ready for use, (also showing what they were used for; machine tools, canteen, etc.) whereas others are depicted as unfinished, some with projected use noted ('projected telephone exchange' for instance).

As we drove through the former army base towards the main entrance, I wondered how much evidence of the former WW2 use would still be visible. I had the US map indelibly etched upon my mind...

We approached, basically, the side of a mountain. There was a cranked entry road, with very high sides of rock. At the end of the approach road was a camouflaged heavy door, protected from prying air-borne eyes by heavy cammo netting. The place still resembled an active bunker.

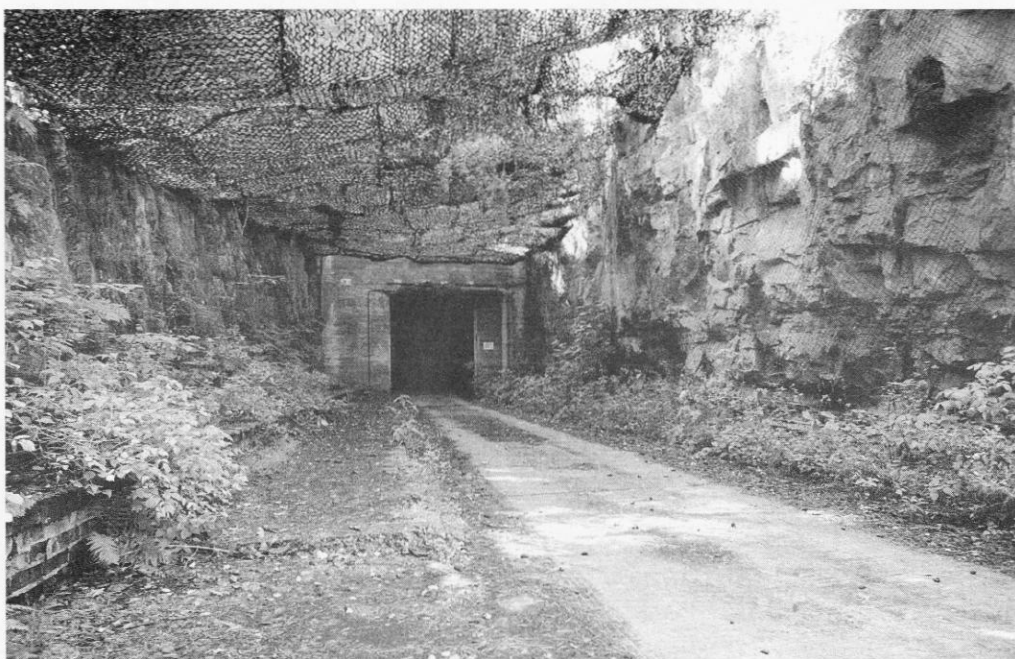
We drove the cars in through the main entrance and into the mountain. The tunnel was huge, accessible by trucks. We waited while our guide opened a very secure inner door, again a massive four metre

high hydraulically operated steel structure. Once inside, we drove along countless huge tunnels in perfect condition, marvelling at their size. This was a first for me - driving at quite high speed through long road tunnels inside a huge bunker. We came across the main railway line and a very, very, long platform for unloading the supplies. We were told that at 450 metres, it was the longest platform not just in any bunker in Germany, but in Germany itself! It had a vehicle ramp too. The rail connection from the main line had been lifted some years back, so it is no longer possible to run trains inside the complex. The tunnels were in perfect condition: dry, well ventilated, clean. The walls were faced and painted, the floor perfect. There were no lights in the tunnels, as the power had been cut off from the town.

After the war, the Russians blasted the system. The Junkers factory was completely destroyed. One half

of the former 13km of tunnelled factory was then turned into a main depot storage area for the NVA. It was a store for weapons, missiles (aircraft), clothing, and a mobilisation depot. The military (by then the Bundeswehr) pulled out in 1994, as by then they had decided they had too many stores. As we walked around this, it was obvious that the place was just as it had been left in 1994 - even the shampoo was still hanging in the showers! It was a surreal scene, walking around in the footsteps of the previous occupants, who although hadn't been there for nearly ten years, were - in fact - the last ones there.

We were asked not to touch anything, and to just look. There were papers still there, cigarette ends in ashtrays etc. Very, very, atmospheric. However, it was difficult to think back to the pre-NVA occupants -



The main entrance to the Halberstadt Complex Photo by Dan McKenzie

the place seemed so clean and clinical...

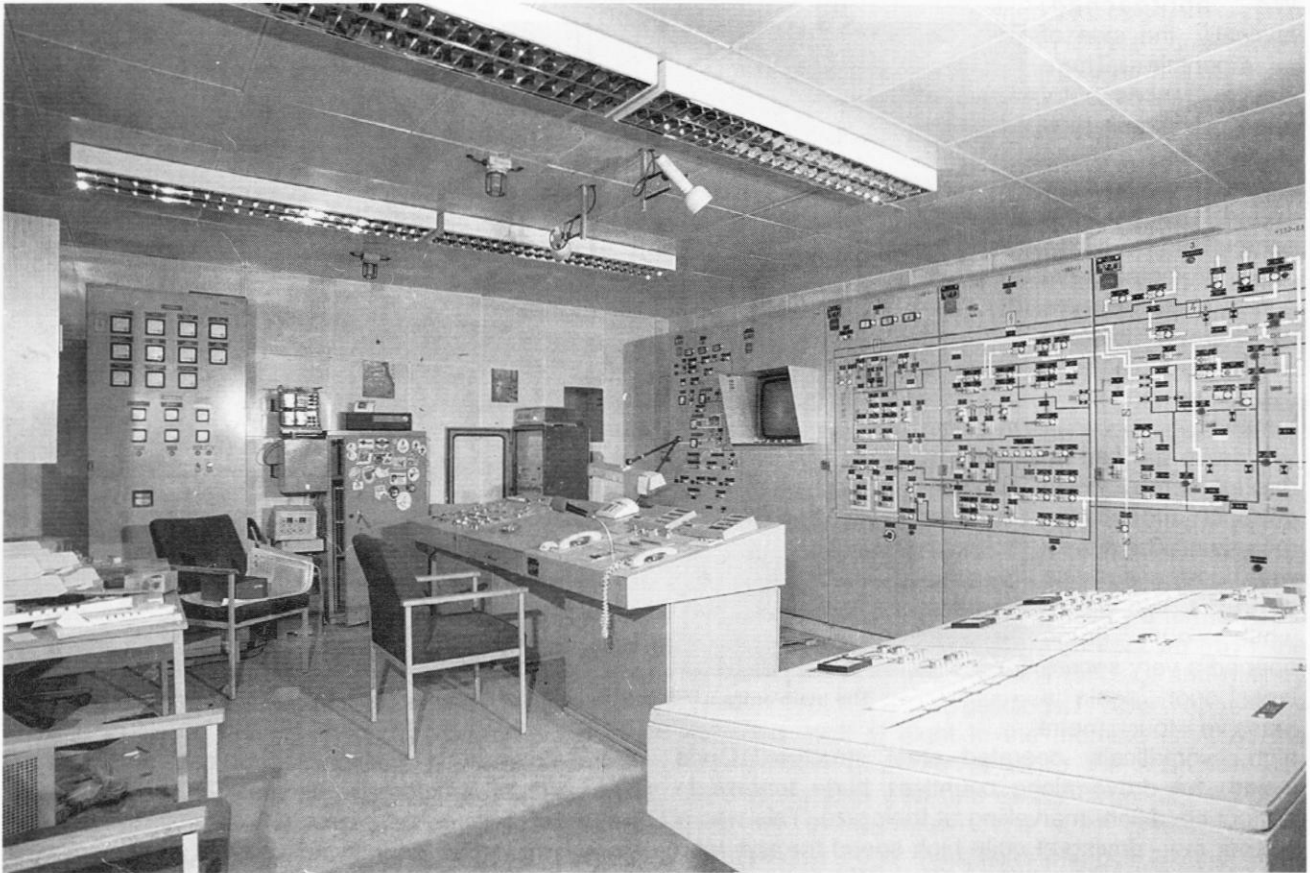
The kitchen was set up to feed 250 people - the apparent full quota. This (NVA) installation was purely a storage depot, and was not designed as a fighting command post. But, there was a command post there should it become needed in the event of a conflict.

We walked round, looking in every room. There were dormitories, wash rooms (very pleasant indeed - most unlike 'usual' military facilities); a still fully equipped control room with CCTV screens overseeing the entire complex (now blank of course) with typical GDR-vintage pictures taken from magazines on the wall depicting trees and rural scenes; a radio repair room; a CCTV spares room; ventilation plant (capable of shifting 60,000 cubic litres of air per hour); fuel (160,000 litres total) and water tank rooms; a generator room with three

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marine diesel engines. I was surprised at how small the generator room was. Inside were three GDR-manufactured turbo diesel engines. Dated 1983, these 100 kpa engines, weighing in at 2.2 tons each, had a mere 400-500 hours of use on them, and drove 3-phase, 400KVA generators. The exhausts went to the outside, and the filters were on the top of the mountain to dissipate the smoke, as were the air intakes. The incoming air for the engines was cooled to make it more dense. There were various drums of oil around, plus the usual maintenance equipment you'd expect - tools etc. It was very clean, the engines were painted orange, and at least one of the diesels had been returned to running order. It all certainly looked in A1 condition. The fuel was stored in eight tanks, each holding 22,000 litres. These

their decision restricting his planned use of his bunker. The issue seems to be one of just how the bunker complex is 'remembered' and/or perceived. The WW2 use of the place still 'embarrasses' perhaps, but definitely holds sway over the GDR use, so it would seem. There are various issues, but I understand that the confused local worry is that if opened publicly, the fear is that it could be homed in upon as a sort of shrine for neo-nazis as it is felt (by the local community) that the Jewish and other KL victims should be remembered there. There is definitely conflict over this, and - as I understand it - the issue is rather how should the inmates and the concentration camps be remembered. Perhaps a case of People need to distance themselves from the past before they can look back on it.



The main control room in the Halberstadt Complex Photo by Dan McKenzie

tanks were in a room above the generator room. The starter batteries were beneath the floor of the generator room.

We were allowed to photograph anything and everything, and go anywhere we wished.

The complex is now owned by a local resident. He wants to open the site as a place of interest (i.e. ex NVA installation) but has met with stiff local resistance. The local authorities have effectively prevented him from opening the site publicly, or using it as an exhibition centre as he wishes to do. He is taking them to court now in an attempt to reverse

To recap, the entire complex had been blasted by the Russians at the end of WW2. The NVA then converted half of the place (around 6.5 km of tunnels) for use as a huge underground store. But what of the 'other' half?

Well, of course I had the hots to visit this other side - despite being repeatedly told that it was in a dreadful state and pretty dangerous. I knew that after German re-unification after the fall of the GDR, the German government had buried all the redundant East German currency - Ost Marks - in a bunker, this one in fact. The money, now worthless, was buried in this

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complex but enterprising individuals dug their way in, stole some of it, put it on e-Bay and flogged notes for unbelievable sums. DM5000 per note apparently. The government moved the lot and incinerated it promptly. The money was buried in the unused side of this complex...

As we walked around, it was fascinating to see how the bunker / factory had originally been constructed. Large, long, side passages led off perpendicularly from the main tunnels. All the workings were in an unfinished state. We could clearly see how the tunnels and galleries had been constructed.

First, the tunnel was hewn out. Then steel railway-line type hoops were arched over the tunnel sides and roof (the tunnel was radiused), and then concrete was poured behind ill fitting shuttering fitted between the rails. This clad the area. None of the tunnels we saw were anywhere near finished. Going back to the US plan, it would appear that this unfinished side was in fact the east side of the complex, as the plan clearly shows that the other side housed machinery bays etc. I cannot believe that this unfinished side was anything other than just that - unfinished.

A local historian tells me that:

"Today the blasted part is the major part of the complete system. The Russians blasted nearly the complete old part of the system, but it is accessible."

I take this to mean that the operational Junkers WW2 factory, the west Part, was blown up by the Russians at the end of the war. They then rebuilt this as the NVA store. They also blew up the unfinished side (probably just the entrances, as was normal) and sealed it from the NVA side too.

Within this abandoned, demolished side we saw the bricked-up tunnel where the GDR money was entombed. In the wall there was a small hole, and we all peered through it, keen to see just where one of the last relics of the former regime was left. Of course, we could see nothing except gloom - but maybe that was in itself fitting.

As we walked through this area, we noted that the floor was in poor condition. None of the walls, ceilings or floors were faced. There was thick sand underfoot, and as we shuffled through it we actually came across a small wad of Ost Marks...

Just lying in the sand was a small wad of EM10 notes. Unbelievable. A tangible link with the past. Weird feeling - as it proved it had really happened. Okay sure, we all knew it had, but to hold it in your hand brought it home with a start. We kept noticing the paper banding previously wrapped around the banknotes. Travelling in search of the past, we'd actually found it.

Our guide was not willing to permit further exploratory ventures into the tunnels due to the danger, so we retreated. We could, however, clearly see how the tunnels had been constructed, with the concrete between the 'hooped' railway lines. The whole place was of pretty rough quality, quite dangerous, with

evidence of roof falls. Incidentally, having visited many ex-Nazi underground factory sites in Germany, Poland, Czechoslovakia and Austria, I have never seen tunnels lined in between railway line-type hoops before. There is no WW2 detritus or artefacts to be seen here.

In conclusion:

We visited the central part of the 'Malchit' system. The western and eastern parts are only accessible via climbing through a labyrinth of cross-galleries. The NVA only used a minor part of the original system, a mere 15,000 sq metres out of the total of over 60,000 sq metres.

A major part of the original system is, in fact, still accessible. We were in the northern central part of it.

It should be noted that the abandoned, blasted, sections contain extremely hazardous materials. The Russians planned destroy them by blasting. However, this was definitely not completed. It is known that these abandoned areas contain Tetraethyl-lead, and most probably the chemical weapons Tabun and Soman too.

Note: Nerve agents GA (Tabun), GD (Soman), are manufactured compounds. The G-type agents are clear, colorless, tasteless liquids miscible in water and most organic solvents. Tabun has a slightly fruity odour, and Soman has a slight camphor-like odour. Most of the nerve agents were originally produced in a search for insecticides, but because of their toxicity, they were evaluated for military use. Nerve agents have been used in wars and by terrorists. They are known to be stored by several nations.

Between 1934 and 1937, Germany developed an arsenal of chemical warfare agents (i.e. Tabun, Sarin, Soman). A fourth agent, VX, was synthesised in England a decade later. Discovered in the course of investigating novel organophosphate compounds for use as insecticides, German chemists synthesised Tabun in 1937, which was later incorporated into the German chemical munitions stockpile during World War II. Later, Sarin, Soman, and other derivatives were synthesised. None of these was used, however, and the West only discovered their existence upon the end of the war.

After many hours beneath the surface, we emerged from the gloom and after thanking our guide, headed off to the next site, nearly 150 miles away, the former East German PTT (Post Office Telecom, basically) satellite uplink station 'Intersputnik' at Neu Golm to the south east of Berlin.

The site came into service 1976 as the first (and only) ground satellite station in the GDR. Then part of the integrated international telecommunications network, 'Intersputnik', (which has nothing to do with the Sputnik remote transmitter sites mentioned elsewhere in this report) was one of 15 INTERSPUTNIK sites which were in service in 13 countries. These sites used to transmit telephone, fax, TV and data signals. In the Former Times, this

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site's services were also used by the then West German PTT services for satellite links to the Soviet Union, i.e. it was a non-military complex. Later, it used the Soviet satellites Stationar 4 and 5 in geostationary orbit 36,000 km over the equator, but initially used the four Soviet Molniya satellites, which were in a non-stationary orbit, i.e. the dish had to be oriented towards each of the four in turn as they came into view for a 6-hour "period of duty". The dish could rotate through 360° and was so finely balanced that a 250 W drive is sufficient to rotate it. However, the entire site is now a conference centre, even if the redundant original dish (12 m in diameter and weighing, with its base, 60 tonnes) is still on the roof. Interestingly (to me anyway!) the satellite site is located in a dip, not on high ground as might be

business is concerned with the detection of land mines, it wasn't... There was a comprehensive display of just about all the various ferrous and non-ferrous (i.e. very hard to detect) landmines found around the planet, augmented with some horribly authentic-looking 'victims'. One hopes that Herr Fischer's business does well, then...

Thursday morning we visited a former tropospheric site near Wollenberg. On the way there, we stopped at one of the twelve 'Sputnik' remote radio transmitter sites which served the main transmitter for the bunker complex at Harnekop, which we had visited on a previous tour. These were basically just a concrete building with a small generator and transmitter inside, which could be operated remotely from the main transmitter site, thus dramatically

reducing the risk of being D/F-ed. [direction finding] They were within a small fenced compound, usually set back from the road, in the trees. Unless you were looking for it, you'd never notice it. There was a phone point on the inside of the gate where the NVA signaller-technician would plug into to report his arrival (and later departure) so that the alarm could be turned off before he opened the security gate.

The site in Wollenberg - 'Station 301' - was one of the three East German sites in the Warsaw Pact BARS (Russian for snow leopard) tropospheric (or forward-scatter) strategic network.

It is now in private hands and is basically a museum. (www.bunker-wollenberg.de)

It has been restored to its former



Satellite uplink station 'Intersputnik' at Neu Golm Photo by Dan McKenzie

glory (not, perhaps, an apt turn of phrase) by the hard working small group of enthusiasts who now own it. The former CO of the base has been drawn back in to help, and despite his initial complete lack of interest, has now turned into one of the keenest helpers and reputedly spends more time there than at home. They have secured the site and have, somewhat worryingly I felt, restored the high security fencing around the site, including a very capable high-voltage electric fence. This, they claim, is being set up to carry high voltage again, 'to deter animals'. The site is ringed by a 2m high outer fence, the electric fence, and an inner 2m fence.

expected, which apparently reduces the chance of any possible electromagnetic interference to a minimum when transmitting: incoming signals were no problem - they had a strength of only 2.5 trillionths W (2.5×10^{-12}). At the site, we were given an excellent talk by its former head, Joachim Berndt, and an illuminating update by its present Owner and Manager, Andreas Fischer, who gave us a comprehensive tour of the facility including the air raid shelter beneath it. In the Former Times, it was customary for such buildings and sites, including civil as this was, to be equipped with sufficient air raid protection for the staff.

After examining the darkness, and the various rooms still containing the equipment befitting its former life, we were taken 'behind some screens' in a large back room to inspect Herr Fischer's collection display of.....land mines. May sound odd, but given that his

This site was, we all felt, one of - if not the - best one we'd seen in the category of 'living museums' rather than 'mausoleums'. Most of us are not particularly interested in 'museums' which, we feel, just comprise piles of static, cased, or stuffed (!) exhibits. This site

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appeared just as it was left when the previous owners left. It would have worked, if it had had the antennas still in place. (They'd been removed).

We were permitted to explore the entire bunker by ourselves, and go anywhere we pleased. It was really interesting. Despite the place having been broken into after being decommissioned, and various things 'removed', the present owners had sought out replacement equipment, and installed it. This is where the former CO was of great help, in setting it all up again.

There were various outside buildings on the fairly large site, all camouflaged and undamaged. There were a full set of offices, in one of which was the secure entrance tunnel to the bunker. The offices also included a medical centre. All the rooms were fitted out with the original GDR furniture and accoutrements. It seemed weird to see the old-style clocks, furniture and cutlery etc., again. There were two storerooms filled with GDR equipment; clothes, dishes, flags, the lot...

For us, it was a magnificent site; totally right with all the correct equipment. From a military historian's point of view, it was superb - a snapshot of the past.

They have a good website - www.bunkerwollenberg.de - with a 'tour', so have a look at Station 301.Go for the key marked 'virtueller Rundgang'.

After lunch at the site, we drove the 20 miles to Prenden, north of Berlin. Mike had indicated that he'd arranged a special surprise for us, and kept us guessing. To be honest, I wasn't too excited as - for me - Halberstadt had been the Main Event, and I didn't feel that anything could eclipse that.

But, actually, something did...

As we arrived at the outer perimeter of an obviously ex-secret site, it became clear that it was pretty large. Once inside, it resembled many of the other sites we'd visited on our various former-GDR bunker tours. This one too had the various office blocks, car parks, associated building complexes and the like. All deserted, and somewhat trashed. There was, however, nothing to hint that below this - improbably enough - was in fact former GDR leader Eric Honecker's bunker: Code number 17-5001.

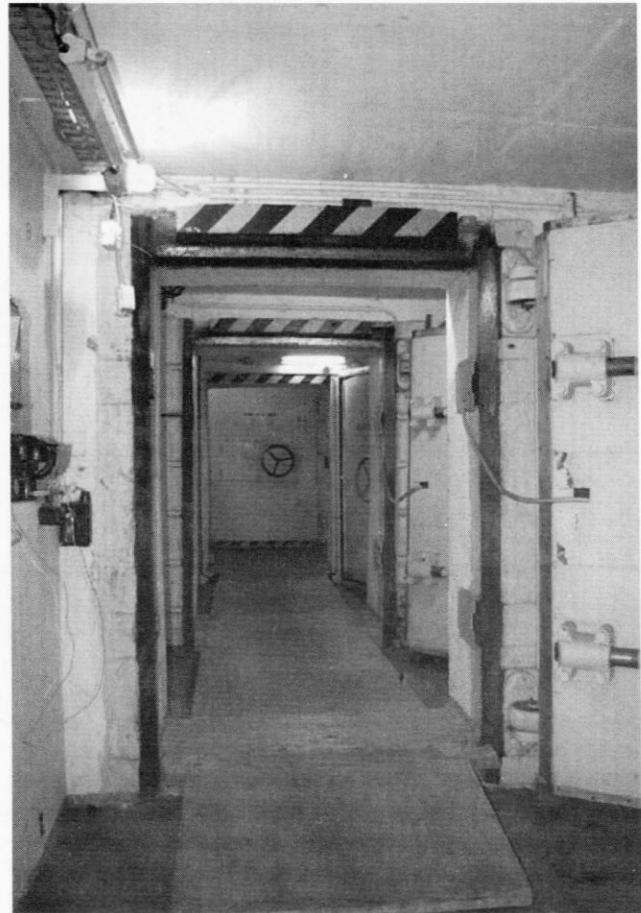
Mike told us this as we got out of the cars. We were impressed, and we don't do impressed (anymore). He assured us that beneath the bland office block in front of us, lay the Big One: the bunker to which a limited number of members of the GDR government would have retreated in the event of a nuclear, and/or chemical attack. This was the bunker where Eric Honecker would have ruled what was left of his German Democratic Republic...

We explored the office block, and noted a flash (for the former times GDR) bathroom and shower. This was Honecker's personal bathroom. And it was...

There were countless offices - mostly trashed - and various papers still strewn around. I looked through many of the papers, presuming anything of importance had already been taken away. Mind you, there were plans and wiring diagrams lying about, so I took some as souvenirs.

We all immediately noted that there was a wide staircase leading down from the ground floor and homed in upon it. This was the main entrance to The Bunker. Mike and Paul, the day's guide, told us that this main entrance had been sealed up a short time after the complex was de-commissioned.

The bunker had been very recently broken into and



Wollenberg Troposcatter site Photo by Dan McKenzie

the site owner wanted to us to be the 'clearing team' as there was some concern that other intruders might still have been down there, especially since the bunker was going to be sealed up immediately we exited. Sure enough, outside we saw the JCB quietly waiting...

As the Main Entrance had been secured shut, our method of entry was down through one of the emergency exits. The JCB had dug away the ground, and had moved two huge concrete slabs apart so that we could crawl down. So in we went. Once inside the exit tunnel, we needed our own lights as there was obviously no lighting down there. We

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walked along a very long tunnel, inspecting the abandoned and trashed offices/rooms either side. They were crammed full of documents, papers, manuals, files - all with the number 17-5001. Yup, this was Honecker's bunker. I knew, and recognised, the number.

I looked through as many of the papers as possible, but they appeared to be just maintenance schedules and manuals/wiring diagrams. There was tons of it.

The next section of the long tunnel had been used as a rifle range. There were piles of ammunition cartons and spent rounds, but no brass cartridge cases - presumably taken for scrap? The end of the tunnel at a dog leg was shot to bits, with big chunks out of the



5001 The Honecker Bunker Photo by Dan McKenzie

walls and ceiling. At the end, where the paper targets were, there was a pile of railway sleeper-type sections of wood that had been totally shredded by the bullets. There were chunks of lead all over the place.

We went past this, and found a hole in the wall which was our entry point into the main bunker. It had been comprehensively sealed previously, and had taken road drills many, many, hours to break through again. We squeezed through and began walking into the bunker.

It was huge. Three levels, multi-roomed. There was a

large quantity of brand new, un-issued equipment in there. Ranging from chef's outfits (which Jason and I felt the need to appropriate and wear), to vibration detecting instruments. We walked round, trying to get our bearings. We worked out the layout of the bunker, but found that there was in fact another bunker within it. There was a bunker within a bunker. None of us had ever seen anything like it. The central core of this structure was independently sprung - hanging inside the main bunker. This central area comprised a large number of rooms, with the whole of the inner bunker being suspended from countless four-inch thick hawsers connected to massive nitrogen filled shock absorbers and cushioned on huge steel springs. It was awesome, it really was. We had seen sprung areas in other GDR Stasi and NVA bunkers before, but nothing like this - nothing on this scale. It was, quite frankly, incredible.

We estimated that each room weighed around 800 tons. We had never seen anything like it. The power plant was on a swinging floor, which we got swinging - the huge weight of the established equipment not hindering our efforts at all. We found decontamination suites, offices, medical centres, hospitals, a broadcasting suite (where I just had to sit, in the place presumably where Honecker would have broadcast the good news), a photographic developing area, stores, living accommodation, toilets, showers, etc., etc. It was huge, and of infinitely superior quality to anything we had (have) in the UK. It was, we all decided, no wonder the Socialist Dream went bust - this joint must have cost millions. It was amazing, the best bunker any of us had ever seen.

We spent over two hours thoroughly examining the bunker, marvelling at its technical aspects, while wondering - if push had come to shove - whether an attack by the West would have actually got Honecker. If he'd been down here, we reckoned he'd have been pretty safe. Sure, a direct hit would have meant the end, but anything other than that wouldn't have. The shock-absorbed bunker would have just moved with the blast. That was its function - the inner bunker would not, theoretically, have fractured or become damaged due to it being independently mounted. Ingenious.

There were various things about this bunker that marked it as being 'different' to the others we have seen. For example, we noted many CCTV cameras mounted around the structure. The decontamination area was fully covered by CCTV, as were main thoroughfares. The cameras were 'robust' and could be directed. i.e. they weren't just fixed and pointing in one direction.

This installation was a prototype bunker - a pattern for the bunker that was to have been built for each government / party in each East European country. But only East Germany could afford it, so this was the only one built. We learnt afterwards that Eric Honecker had a suite of rooms in the approach

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tunnel as well as in the bunker proper and in the office block above.

After exiting the bunker, having found no-one apart from a few ghosts from the past, the JCB got to work and sealed it up once again. Mike told us later that very, very, few people had seen inside, and certainly no-one from the UK. Just a short distance down the road, we had coffee and sausages in a converted long bunker now being used as a small-bore shooting range....by a very suspicious (to us, anyway!) group of blokes who smacked heavily of ex-Stasi. It seemed as though the entire area was infested by ex-Stasi types who seemed unwilling to leave. It was dead weird, and we all picked up on it. Lots of black leather jackets, cigarette smoking, and guns. Sort of a Stasi-Club deal. Strange. These bunkers were part of the Honecker complex and had been used for communications purposes, including vehicles, etc. There was also a remote wireless site a short distance away which was associated with the site, but we didn't visit it.

We drove some distance to that night's accommodation, but via a local Stasi (!) bunker. The site was being used as an asylum seeker accommodation centre, and the above-ground buildings were homes to a large group. The bunker was basically empty, and in pretty rough condition, but in the entrance buildings was a large quantity of junk removed from the bunker. This was really interesting to pick through as it revealed a few gems. Mark found a complete chemical / gas detection kit, and there was a mountain of ancient GDR televisions in a huge heap.

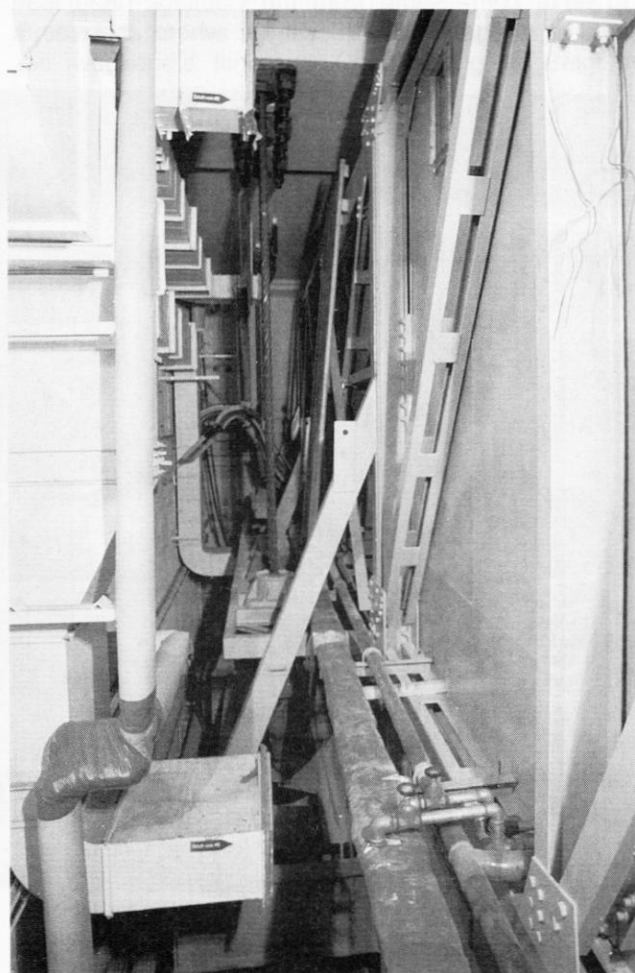
That night we stayed in a riding stable complex which used to be the secret training area of HA 22, the department responsible in EGER for anti-terror operations (define that as you like). Incidentally, a 53-year old man was recently arrested in Berlin on charges of being a hired 007-killer for the SED, the EGER govt. Anyway, the guy running the place looked really hard, and we weren't at all surprised to learn that he used to be the Head Man there in the HA 22 days; boss man then - owner now. Bit strange that - how was it that former 'bad guys' of the discredited regime were back, living openly and apparently doing okay?

After a night in the rooms of HA 22, we drove into Berlin to the Stasi museum, in the former Stasi HQ in Normannenstrasse which was excellent albeit entirely in German. What fascinated me were the former times information boards exposing the West as being full of fascist scum hell bent on corrupting the Socialist Dream, and waging a war of terrorism upon the peaceful residents of the Socialist countries. (somehow Vietnam and the financing of left-wing terrorist cells such as the Baader Meinhof Gang, and the Red Army Faction weren't mentioned...). There were countless photos depicting the story from both sides, and an especially interesting section on the Czech and GDR uprisings. Fascinating place, but all

in German. I wanted to spend much more time there, but...

In the afternoon we went to the Luftwaffe museum which was full of.....aeroplanes. Aircraft from east and west, from earliest to latest. We spent a couple of hours there, before heading off to Glienicker Bridge over the river Havel between Potsdam and Berlin and the former gateway to East Germany, to re-enact various spy hand-overs. There were still WW2 bullet holes in the bridge, and all it needed was for us to be wearing trilbys and mackintoshes. Which, thankfully, we were not.

From there we headed back across a rush-hour-on-a-Friday-night Berlin to Schonefeld airport, mucked the



5001 Bunker suspension system Photo by Dan McKenzie

cars out, checked in, and checked straight out.

The end of (another) brilliant week.

Our thanks must go to Mike Barton who arranged and smoothed the way into the sites visited, even though he said last year "never again"!

Those taking part were, Tony Page, Nick Catford, Jason Blackiston, Robin Ware, Richard Challis, Andrew Smith, Mark Bennett, Dan McKenzie and of course Mike Barton.

From Tony Page

Who Runs Sub Brit?

We hope to bring you a profile of all the committee members in future issues. We start with :

Paul W. Sowan - The Chairman

Paul Sowan is Chairman and a former Secretary of Subterranea Britannica, with a membership record extending back to the mid 1970s, although he was not a member right at the very beginning. He attended a meeting convened at the Institute of Archaeology (University of London) by Sylvia Beamon, and went home with a job! He was born in north London in 1940, but the family name appears to have come south from the Wanlock head lead mining village in Dumfriesshire, where there is a



small mountain called Sowen Dod. The likelihood is the family name comes from the mountain - perhaps the first Sowan was found abandoned in the heather? He was narrowly missed by a V2 rocket in 1944. After two primary and three secondary schools in Croydon (he was not expelled from any of them) he took a degree in geology, and then spent almost 40 years as a teacher in two Croydon secondary schools - science (mostly chemistry and physics), and careers education. In the last years before retirement he also ran the school library. For many years he spent a month in Iceland every summer, mountaineering amongst the lonely peaks and glaciers in the mid north of the country. He speaks

enough (very bad) Icelandic to cope with the shopping, and travelling around Iceland. He has camped on an active volcano, but only watched actual eruptions from a safe distance! One of his camp sites is now under a lava flow! Back in Croydon he has, since 1963, been, by turns, Secretary and President of the local natural history society, and is currently a vice-president, as well as librarian and company secretary. In its early days, SB mainly concerned itself with castle dungeons, secret tunnels, grottoes, hermits' caves, rock-cut cellars, ice-houses, fogous (Cornish and Irish souterrains) and the like. There was a strong Nottingham membership, as that City has some 500 rock-cut cellars and other underground works. PWS extended the Society's interests to include mines, underground quarries, and transport tunnels. He is

now delighted that the net is cast even wider, to take in military and Cold War sites (something we were hardly able to do until the Cold War ended!) Since getting involved with SB he has (often with Sylvia Beamon) represented the society at international conferences in Belgium, Croatia, the Czech Republic, France, Italy, and The Netherlands; liaised with local researchers in, Iceland, and Ukraine; and travelled also and explored underground in Germany, the Faeroe Islands, and Poland. He has especially close links with our Dutch sister society, Studiegroep Onderaardse Kalksteengroeven, and has been visiting Maastricht and the very impressive underground quarries in its area for something like 30 years. His experience underground has extended to include several working mines (coal, gypsum, rocksalt) and underground quarries, an active RAF bomb store (Chilmark), a (very wet) horizontal well (Folkestone), a road tunnel in course of construction (in Croatia), Ukrainian limestone and salt mines, and the mothballed 1974 Channel Tunnel. His

main subterranean research interests and publications have concerned underground building-stone quarries, mines for miscellaneous minerals, and the history and archaeology of civil engineering works, especially transport tunnels, cuttings, and embankments. Since retiring about five years ago he has collaborated with Historic Royal Palaces in researching Reigate stone and its underground quarries, and worked on the archaeology and history of a number of large complex lime-kilns in east Surrey which are currently, at his suggestion, being upgraded from Listed Buildings (grade II) to Scheduled Ancient Monument status. He also has two SSSIs (Sites of Special Scientific Interest) to his credit.

Sub Brit in Belgium – Burrowing, Birthdays and Beer

2003 marked the 5th anniversary of our Sub Brit trips to the Continent and to celebrate we added on an extra day and ventured to Southern Belgium and the Netherlands. Most of the sites were in Southern (French speaking) Belgium, the Flemish North being too wet and silty to support any significant underground features. Thirty five of us met up at Ashford station, embarked on our usual Crosskeys coach and set off for the Channel Tunnel. Frequent miners were awarded 'tunnel miles' and on top of the usual study pack a (short!) quiz on famous Belgians was distributed. The undersea crossing – a first for a number of members - was smooth and uneventful.

Two hours drive found us at La Malogne on the outskirts of Mons and we met up with Joep, Ton and Wiel – colleagues from SOK the Netherlands underground group - who were to join us for the weekend. La Malogne is a former Chalk Phosphate mine (extracted as a fertiliser) and Freddy LeClerq gave us a thorough guided visit of the site. Opened in 1876 and closed in 1925 (though subsequently used for mushroom production), this is the largest underground site in Belgium covering over 100 hectares. The mine still has old rails and trucks and also has fossils, bats and an underground lake. We were followed in by a wheelbarrow full of

drinks and the tour culminated in an underground bar where we drank the beer specially brewed for the mine.

Our next site was also the oldest of the weekend – the Neolithic flint mine at Spiennes. These are quite similar to Grimes Graves in England but, despite being a World Heritage Site, are almost unknown. In the whole of 2002 they were visited by under a thousand people. Splitting into smaller groups, we descended 35 feet and six thousand years. A number of galleries off a central shaft exposed seams of flints which were mined and knapped for axe heads and other blades. To see the tool marks left by the original miners using deer antlers lent an unforgettable atmosphere to the visit. Helene, Jean-Pierre and Michel gave us an enthusiastic and informative tour not only of the underground features but also of excavated artefacts.

From here we headed to Namur and our home for the

next two nights – Hotel de Flandres. In true Sub Brit fashion, the first off the coach were already downing their first beers before the last stepped off! We ate at the hotel, one of the oldest in Namur, and over a leisurely evening renewed old acquaintances and made new ones. Our youngest attendee, Callum Barnes had us in stitches with his word perfect rendition of Fawley Towers despite the fact that the programmes were all transmitted before he was even born.

Sunday morning saw us off to Blegny – the only coal-mining museum in Belgium with underground access. We were joined by Luc Stevens, president of SFES (Societe Francais Etude Souterrains) who lives in Brussels and was hugely instrumental in organising the weekend's itinerary. Coal mining in Belgium



mirrors that in England and from hundreds of mines, Blegny was the last in the region to close in 1980. We started the visit with a well produced and poignant film of the coal-mining history of Belgium. But, as the guidebook says 'you have to fall down to understand' and we did exactly that, descending by cage to the 30 and 60 metre levels. We were guided in two groups by ex miners. The unlucky group had a guide with a broken jaw, whose native tongue was Italian and spoke in French. The other group filled in any gaps when we recombined. The mine itself was full of authentic remains of the industry including extensive (working) compressed air operated drills. The surface treatment machinery was also intact and demonstrated.

Our second site for Saturday was the Koelebosch limestone quarry in the Netherlands. We were met by a larger group from SOK who led us to what I can only describe as the grandest picnic I have ever

Sub Brit in Belgium – Burrowing, Birthdays and Beer

experienced. Laid out at the entrance to the quarry - a mile from the nearest road - was a stupendous feast of meats, cheeses, salads, fruit, pickles, bread, pastries and local delicacies. SOK were flying a Union Jack in our honour and had even rigged up a generator so they could keep the drinks cold and brew real coffee. Sub Brit presented SOK with some books on underground Britain as mementoes of our visit and we all sang 'Happy Birthday' to celebrate the group's 25th anniversary.



Joep Orbons then led us on a guided tour of this historic quarry. It dates back to the 16th century and finally closed in 1900. Extracted in classic pillar and stall manner, the walls have huge amounts of contemporary graffiti. Joep gave a vivid explanation of the extraction technique at one of the half worked faces. After mining finished, the site was used for

mushroom growing for a while but is now looked after by SOK and is an important roost for bats. On leaving the quarry we were treated to yet more food and drink from our generous hosts.

Back to Namur we ate underground in an Italian Restaurant located in a mediaeval crypt which was only rediscovered (the crypt, not the restaurant) when Second World War bomb damage was being cleared. Speeches and toasts finished the meal and a nightcap was taken at the hotel bar. Apparently local law demanded the bar close at midnight on Sunday. Our pleas that it was now Monday seemed to fall on deaf ears!

On Monday we started the day by staying in Namur for a visit to the immense Citadel. This has a complex history having been built from Roman times to the 20th century. Terry our coach driver earned his laurels (echoing previous years) by liberal interpretation of width and weight limits. We were treated to an informative if somewhat surreal trip round the site on a tractor drawn train before venturing underground. We visited three sites, the first of which were some horseshoe shaped tunnels built to reduce the curves and take trams round hairpin bends on the steep climb to the Citadel. These are now used for wine storage by a local merchant. The second site was a through trip using tunnels from the 15th through 20th centuries. These are built in stone, brick and native rock though some parts are unfortunately now shotcreted. Off the tunnels are many galleries, and remains from sally ports to latrines. Most of the complex is usually lit but with a local power failure the visit was far more realistic by caplight. Finally we ventured "off piste" into low counter mine galleries, with arched openings marking the places where further tunnelling would reach out to combat enemy mining attempts.

After lunch overlooking the city of Namur, we started our journey back to Calais, stopping en route at our final site of the weekend. This was Folx les Caves, a small almost boutique site. Monsieur Racourt and his family have been guiding visitors here for scores of years. The origins of the site are unclear but most of the calcitic chalk was probably extracted for agricultural use. The site was used for many years for the annual village Whitsuntide dance until barred on health and safety grounds. Some of the history described by our guide had to be taken tongue in cheek but the site gave a relaxing end to our weekend.

Bidding goodbye to SOK we headed back to Calais for our return shuttle with lots of encouragement to continue our annual Sub Brit forays to the Continent.

From Martin and Linda

Subterranea Britannica - Annual Report 2003



SUBTERRANEA BRITANNICA

Adopted at the Annual General Meeting held at Cambridge on 18 October

1. Constitution and Rules

A new Constitution was adopted at the AGM held at Cambridge on 19 October 2002. The Constitution refers to the Society's *Rules*. With the exception of the Email List Charter (referred to below) such rules have yet to be formulated.

2. Annual report and audited accounts

In previous years, reports, accounts, balance sheets, and independent financial examiner's reports have been circulated only to those attending the Annual General Meeting, at that meeting. The Society's new Constitution requires that an Annual report and Independently Examined Accounts and Balance Sheet should be circulated to all members 21 days in advance of the Annual General Meeting. Regrettably the lack of a Secretary for several months, and unusual pressures on the Chairman and Treasurer, have militated against this this year. It is intended to publish these documents as required by the Constitution in future years.

Subterranea Britannica was founded in 1974 to encourage and promote the study of all aspects of underground objects spaces and structures of any period made or used by human beings. During the year the Society has pursued this aim principally by organising conferences, by organising field excursions within Great Britain, Belgium, and The Netherlands, by issuing publications, and through its Email List and Website.

Audited accounts for the year ended 31 December 2002 accompany this report.

3. Membership

Membership at 7 October 2003 was 841, including ..
Honorary Members

22 Exchange Members (other societies etc)

Ordinary Members (of whom 112 are in arrears with

their subscriptions)

The Honorary Members are C.I. Bayley (for his work in connection with the survey of the Chaldon / Merstham underground quarries in east Surrey), Mrs. S.B. Beamon (the Society's founder), Prof. C.T. Shaw (the Society's President), and Mrs. B.M. Tadd and Mr. M.H. Tadd (for their work over a long period of time in connection with secretarial duties, the production of newsletters, and the organisation of day conference and study weekends programmes and arrangements.)

4. Core activities

The Society's 'core' activities are advertised in writing to all members and, as in previous years have included two day conferences (at Cambridge and London), a Cold War conference at Hack Green (Cheshire), a study weekend (in Pembrokeshire and adjoining parts of Wales) and a long weekend visit to mainland Europe (this year to sites in Belgium and the Netherlands.) Arrangements at the Imperial College Union premises for the Spring Day Conference were unsatisfactory, so we will be reverting to the Royal School of Mines. We have as required paid speakers' fees and travelling and hotel expenses, and have decided to invest in a portable public address system to ensure that all speakers can be heard clearly.

The continental weekend extended to the Bank Holiday Monday this year, and was based on hotel accommodation at Namur (Namen.) Sites visited were a phosphatic chalk mine and the Spiennes prehistoric flint mines near Mons (Bergen), a coal mine at Blegny near Liège, the Citadel tunnels at Namur, the Folx-les-Caves excavations near Landen, and the Koelebosch underground limestone quarry at Bemelen (Netherlands) where our sister organisation Studiegroep Onderaardse Kalksteengroeven welcomed us to their 25th anniversary celebration with a quite stupendously sumptuous picnic lunch in a sunlit woodland glen immediately outside the quarry mouth. A number of SOK members including its principal officers Ton Breuls and Joep Orbons

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joined us for the entire excursion, as did Luc Stevens, an officer of our French sister society Société Française d'Étude des Souterrains.

The Committee and the officers and members booking speakers and arranging visits have endeavoured to provide for members' wide range of interests in selecting sites and topics.

Members at large should appreciate that officers and members of the committee are all voluntary workers for the Society's and its members' interests, and devote a great deal of their own time to advancing its objectives. In many instances, too, they make their own personal computing equipment and expertise available for Society business.

These core activities (along with receipt of the Society's publications) represent the basic membership entitlements.

5. Fringe activities

As a matter of longstanding policy, members are encouraged to arrange between themselves additional field visits. A number of individual members, as in previous years, have arranged numerous such meetings. Attendance at these additional field meetings is generally restricted to Subterranea Britannica members, for insurance purposes. However, it is not practicable to advertise all such fringe activities of all such events to all members by mail: they are too numerous, often arranged at very short notice, and often restricted by site owners to very small groups. Members having Email access can readily ascertain what visits are in prospect and apply to join. Members without Email access can at any time telephone John Burgess to find out what visits are in prospect, and likewise apply to join. Places are allocated, at the discretion of the organisers, on a first come first served basis. Members should appreciate however that all 'fringe' visits are essentially private arrangements between members, not centrally organised by the Committee. All members are encouraged to arrange additional visits of this kind, and to invite other members to join them.

6. Publications

The formerly separately published *Secretary's Newsletter* and *Siren* have now been merged into a single new title *Subterranea* of which two issues have been published. These several titles, published several times each year, have compensated for the infrequent publication of the *Bulletin* in recent years. It is intended to continue to publish the *Bulletin* from time to time as the supply of papers of a suitably high standard and level of interest allows. There has been no *Bulletin* for several years principally as a result of

a lack of submitted papers of appropriate quality for publication. One or two papers received have required a considerable amount of editorial work. One paper offered failed to materialise. We offer our apologies for those authors who have submitted papers for the delay in their publication.

The next issue of the *Bulletin* (number 32) is expected to contain all or most of the following papers:

Sylvia Beamon: Ice houses associated with grottoes and follies

Sylvia Beamon: Strange engraved stones from a wall in Burwell (Cambridgeshire) and their connection with Royston Cave (Hertfordshire): a cautionary tale

Jonathan Gill: Berry Hill ice-house, Taplow, Buckinghamshire

Simon Mickleburgh: Bats and underground spaces

Tony Page: History of the construction of the Miedzyrzecz fortified front (Poland)

Paul Sowan: Hearthstone, a mineral pigment mined in east Surrey, and related materials

Paul Sowan: Post-medieval mining and civil engineering in Reigate (Surrey), its Castle, caves, silica sand mines, and pioneering road tunnel

7. The Subterranea Britannica discussion Email list

During the year three members' access to participation in the Society's Email List has been withdrawn as a result of inappropriate and / or unacceptable language or practices. Members are reminded of the terms of the *Email Mailing List Charter*, with which those participating in the List should be familiar and which they are deemed, by using the List, to have accepted.

Emails are to be relevant to the Society's Objects (Constitution 2.1), and worded in a civil and considerate manner. Authors of Emails posted to the List are to avoid the use of potentially libellous or slanderous comments, and to avoid the discussion of political or sectarian questions (Constitution 2.3.11.) Private Emails are not to be re-posted to the List without the agreement of their authors.

Members who do not observe the conditions will, according to the seriousness of the transgression, be given a warning, have their Emails moderated, or suspended from participation in the List pending review in due course by the Committee.

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8. The Subterranea Britannica Website

The Website has been widely praised both within and without the membership, and is visited by very large numbers of enquirers. Whilst it is still currently predominantly devoted to Cold War sites, steps are now being taken to include many more sites of other kinds such as mines, tunnels, and underground quarries. Members should appreciate that many of the site visits featured have been organised by, and the reports and photographs contributed by, individual members or groups of members in their own time and at their own expense. These 'fringe' visits should not be confused with the Society's 'core' events and general membership entitlement referred to above. The Society is greatly indebted to those members who contribute reports and photographs, and who use their own time and equipment to make the Website so impressive.

9. External relations

Several Officers and members of the Committee represent the Society at meetings of such bodies as the Association for Industrial Archaeology, Council for British Archaeology, National Association of Mining History Organisations, etc; deliver lectures on aspects of the Society's work; and represent the Society at conferences in the United Kingdom and abroad, usually at their own expense.

There have been some isolated cases of intemperate language used in member-to-member exchanges or between members and non-members (principally by Email or telephone) which potentially detract from the Society's good reputation, and which are not acceptable. Exchanges between members, or between members and non-members, should at all times be courteous and professional. Members are reminded of the terms of the Constitution, specifically items 2.3.11, and 3.3.4.

2.3.11 The Society shall be non-political and non-sectarian.

[Membership shall be terminated] ..by resolution of the Committee in the case of Members whose conduct in connection with the objects of the Society is considered to be detrimental to the fulfilment of those objects and to the Society's reputation or who fail to comply with the provisions of paragraphs 2.3 to 2.3.11 and the Society's Rules or who misrepresent themselves as acting with the Society's consent or on the Society's behalf.

Members are reminded that they should not represent themselves, especially to owners or occupiers of sites, as acting for or on behalf of the Society other than when specifically authorised to do

so by the Officers and Committee. On a more positive note, it is pleasing to be able to report some very positive feedback from a number of officers of English Heritage, and that the acknowledgements in that body's recently published volume *Cold War: building for nuclear confrontation 1946 - 1989* include references to the work of several members of the Society.

10. Other aspects of information dissemination

The Society as a matter of policy does not intend to attempt to establish or operate a library. We receive a number of periodical publications of other British and foreign bodies by exchange, including for example the following:

Bulletin of the Grampian Speleological Group

Follies [Folly Fellowship]

Journal of the Railway and Canal Historical Society

Newsletter of the Chelsea Speleological Society

The British periodicals are not retained, but generally deposited in appropriate libraries, as more complete sets of these are readily accessible via the public library system.

Foreign periodicals received by exchange include:

Bulletin d'Information Trimestriel [Groupe de Recherches Souterraines en Milieu Artificiel (Belgium)]

Der Erdstall [Arbeitskreis für Erdstallforschung (Germany)]

SOK Mededelingen [Studiegroep Onderaardse Kalksteengroeven (The Netherlands)]

Speleolog [Croatia]

Subterranea [Société Française d'Étude des Souterrains (France)]

Subterranea Belgica [Société Belge de Recherches et d'Étude des Souterrains (Belgium)]

As these foreign journals are almost certainly the only copies other than any in private ownership within the UK they are held pending identification of a suitable publicly accessible home for them. Although we do not aim to retain these items ourselves, we do keep full and accurate bibliographical details for all major papers within them. The Chairman compiles voluminous bibliographical details of publications (including individual papers in periodicals) relating to

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underground sites (predominantly the literature of economic geology, extractive industries, and civil engineering) within the UK and beyond, and can generally advise members and others what has been published on specific areas or topics, or by particular authors, and where copies may be consulted. This bibliographical data is or will be available via the internet.

The Chairman has also contributed entries for the Greater London Industrial Archaeology Society's sites and monuments Database, and bibliographical data and book reviews which are published in several national bodies' journals, especially those of the Association for Industrial Archaeology and the Railway and Canal Historical Society.

11. Handbook

This Report is considerably longer than any previous one, but is submitted to give members as full an overview as possible of the Society's activities. It is proposed in future to include much of the material in a proposed *Members' Handbook* rather than repeating it in each *Annual Report*. This handbook will also contain such *Rules* as the Committee may ultimately formulate.

12. Human resources

The Society is in a strong position, with a still growing membership, and with a number of new officers and members of the committee. An indicator of this strength is the fact that a new Treasurer and no fewer than three offers to take on the Secretaryship were found during the year. Individual Committee Members are increasingly being held responsible for specific areas of work. A number of aspects of our activities need additional member support at executive level.

Amongst a membership of the order of 800, and growing, there must reside a very considerable reserve of expertise, skills, and goodwill which is potentially available to the Society. We have probably hitherto, for various reasons, failed to exploit this resource to its full extent. We are anxious to do so. We apologise to those members who took the trouble to complete our green 'skills and interests' forms on joining, who must be wondering why they did so, in the absence of any follow-up. A member of the Committee is now undertaking the task of exploiting this resource. It must also be admitted, of course, that amongst such a large membership there is the risk that it contains a few irresponsible persons who may prejudice the Society's good name.

13. Officers and Committee

During the year Jason Blackiston resigned as Secretary, and has been replaced by Roger Starling as Acting Secretary with a view to formal election as Secretary at the AGM. Sue Monsell has been co-opted to the Committee with a view to taking over as Treasurer from the AGM, Gerald Tagg having intimated his wish to stand down in that capacity, although he is willing to remain an active member of the Committee. Mark Bennett has resigned as a full voting member of the Committee but continues as Webmaster. Mark Bennett, Bruno Hewitt, David Mapley, John Smiles, Andrew Smith and Robin Ware have been co-opted during the year as non-voting members with a right but not a duty to attend Committee meetings.

14. Third party insurance

The questions discussed at the 2002 AGM concerning the Society's third party insurance cover have not been resolved, and remain a very active topic for this and other societies concerned with access underground. During the year we have purchased such third party insurance cover as required for specific core events in respect of those members attending them. It appears likely that the eventual outcome will be that it will be up to individual members to opt into this insurance either through this or another society whose members go underground (caving or mining history societies for example.) It should be clearly understood that the insurance included in the membership subscription in the past has been third party insurance only. As in the past, members remain entirely responsible for their own personal insurance arrangements.

Some consideration has been given to the compilation of a risk assessment sheet to be used in connection with all underground visits, although work on this remained incomplete by the end of the year. The *Health & Safety at Work, &c., Act*, places a duty of care on all of us, its scope being far wider than persons in paid employment. All organisers of and participants in site meetings, whether 'core' or 'fringe', are reminded of their responsibility jointly and severally to assess the known and possible hazards at any particular site, and ensure that all members of the party are fully aware of these and act accordingly.

Paul W. SOWAN

CHAIRMAN on BEHALF OF THE COMMITTEE

A Day Trip to Altengrabow, Germany.

Private Day Trip to Altengrabow, Germany. November 11th 2003.

That the budget airlines offer cheap flights makes it very difficult to resist excuses to visit locations in eastern Germany at the flimsiest excuse. We knew that the former Soviet base at Altengrabow near Magdeburg was due for demolition, so when Dan announced he was thinking about buying a Trabant Kübel (an NVA model; a convertible!) which was up for sale in Barleben, a couple of Kms north of Magdeburg, we convinced him it was definitely worth a close inspection, and basically went along too.

A large Sub Brit group had visited the huge Altengrabow site back in April 2001 on Mike Barton's first German Bunker Tour, and at the time a few of us vowed to return in order to photograph the multitude of above-ground buildings. On that occasion Mike had obtained permission for us to enter and explore the derelict communications bunker located at the rear of the 'domestic' site and as Mike had a tight schedule to keep to, we only had a short time to look around the myriad of surface buildings. News had filtered through that the German authorities shortly intended to demolish the site, so - spurred into action - we contacted Mike in Germany and asked whether he could arrange entry to the closed site for us. Mike kindly arranged it, and said he'd come along too as he wanted to take a few photos himself. Game On!

We felt that we could accomplish the two goals - i.e. Trabbie Kübel inspecting, and Soviet building photographing - within a day, so Ryanair tickets and a rental car were booked. Dan, myself (Tony Page), Robin Ware and Nick Catford mentally prepared ourselves for a day trip to Germany; which in real terms meant getting up at 0330 to get to Stanstead for the 0630 flight to Berlin, and back at half past midnight. Best Laid Plans...

Arriving in Berlin at 0930, Schonefeld airport was dispensed with with its usual ease and we departed from the car park with our hire car and headed straight for Altengrabow, 20kms east of Magdeburg, where we met Mike. Nick, Robin and I spent the next four hours systematically photographing the former Soviet base's buildings some of which, it has to be said, were in a perilous state. The base is vast. There are literally hundreds of buildings which made up this huge Soviet Training Area and ammunition storage site.

During the Cold War it was under the control of the

Russian Third Shock Army based at Magdeburg. The Third Shock Army - the powerful armoured fist of the Soviet Western Group of Forces, which was tasked with clearing the way for the seven-day trip to the English Channel which the Russians had planned for themselves and their East German friends - had four tank divisions and one motorised rifle division. In order to prepare for this, the Russians made ample use of the Altengrabow Training Area (8 x 12 km). In fact, the location is much more than just a training area. Altengrabow was home to some thirty units, varying in size from a divisional HQ, via a missile brigade, numerous air-defence units (also missiles), armoured units, motorised infantry plus several signal functions. Back in 2001, our Sub Brit tour visited the



The Main Parade Ground at Altengrabow flanked by three storey barrack blocks- Photo by Dan McKenzie

rather impressive comcen (communications centre) bunker up in the corner of the Training Area.

All of this military might requires a lot of ammunition. Like the East German armed forces (NVA), the Russians never went anywhere without having their full war-time ammunition levels with them, i.e. vehicles were permanently armed and bombed-up and ready to go. Despite this, they still managed to require an extensive munitions depot at Altengrabow (also visited in 2001) to provide an immediate reserve for their possible needs. The depot included a special weapons store, i.e. for nuclear munitions. (see the Sub Brit web site for the original trip report and photos)

All of the units naturally required accommodation for their soldiers, so large areas on the perimeter were taken up with massive three-storey accommodation blocks and supporting facilities (canteens, garages, supermarkets, shops, sports halls, heating plant,

A Day Trip to Altengrabow, Germany.

etc.). The Training Area has now been taken over by the Bundeswehr, (German Army) which has built its own accommodation blocks. The Training Area proper is still used for armoured training, but most of the former Soviet buildings are empty and unused, and are slowly falling down. The future does not look good for the site: no-one has a use for poorly constructed buildings whose fixtures and fittings have all been removed, some being returned home to Mother Russia and some being used to improve the lifestyles of the local community - so the decision has been made to return the area to its former wooded state.

The buildings will eventually all be demolished. On our original 2001 visit to the comcen we had little time for this side of military life, hence this one-day

At the centre of the complex, surrounding the parade ground, are located five multi-storey barrack blocks and one large gymnasium. The barrack blocks have been comprehensively stripped; flooring has been lifted in places, light fittings gone, windows are falling out and the very basic toilets are gone - it must have been a strange sight to see heavily laden army Zils trundling back to Russia loaded up with used toilets and sections of flooring but recycling of this nature was a necessity at the time. It is possible to climb on to the flat roof of the barrack blocks and from here one can get a good view and even better impression of the parade ground with its Birch trees and scrub now covering up the evidence of the former tenants. A brisk march from one end of the parade ground to the other brings you to the gymnasium. It is now an

almost empty hall with remnants of netting draped from the high ceiling and large sporting motifs stencilled onto the walls. An uneven staircase made from scrap iron leads up the outside of the building to the projection room high above the floor below where no doubt many a stirring and patriotic film was endured by the reluctant conscripts seated below.

Further exploration of the site uncovered what we presumed to be the sauna or washrooms - but it can be difficult to positively identify some of these structures as years of neglect, 'borrowing', and the fact that they weren't the best-built buildings in the world has left them in a distressed state.



The sports hall at Altengrabow- Photo by Dan McKenzie

photography trip.

As we got on with the serious business of photography, the British Army were to be heard putting some large-calibre automatic weapons through their paces elsewhere in the area. Mike assured us that they knew we were there...

The date was November 11th, and a few seconds before 1100hrs (British Time) the firing stopped and there was absolute silence all around. The Sub Brit Team had brought a poppy or two, and I placed my one under a tree at the appointed hour and spent two minutes in quiet reflection.

Dan and Mike went off to view the object of Dan's desire, arranging to meet the rest of us outside later. Given that the base was so large (50,000 troops) we had our work cut out in the photography dept. We split up, in order to cover the most ground. The weather was absolutely ideal: perfectly clear, sunny, pretty cool but not really cold. A fantastic day, beautiful.

Standing out from the decay inside was the odd sight of two sets of Olympic rings, their colours still bright, mounted in a steel framework surrounding an indoor garden complete with soil and topped off with decorative wall art and posters of exotic locations and palm fringed beaches. Bizarre.

Most of the remaining buildings are now empty shells, some of them I suspect were probably built using the foundations of the former WW2 Stalag 11A PoW camp originally located here, but positive identification of these particular structures is difficult. (Altengrabow was a PoW camp in both WW1 and WW2.)

We wandered around the large U shaped dining hall, complete with its inspiring mural at one of the end walls, located off to one side of the domestic site and behind this was the building containing the coal-fired heating plant for the whole site. This hasn't changed much in the intervening years between our first visit and the present time.

A Day Trip to Altengrabow, Germany.

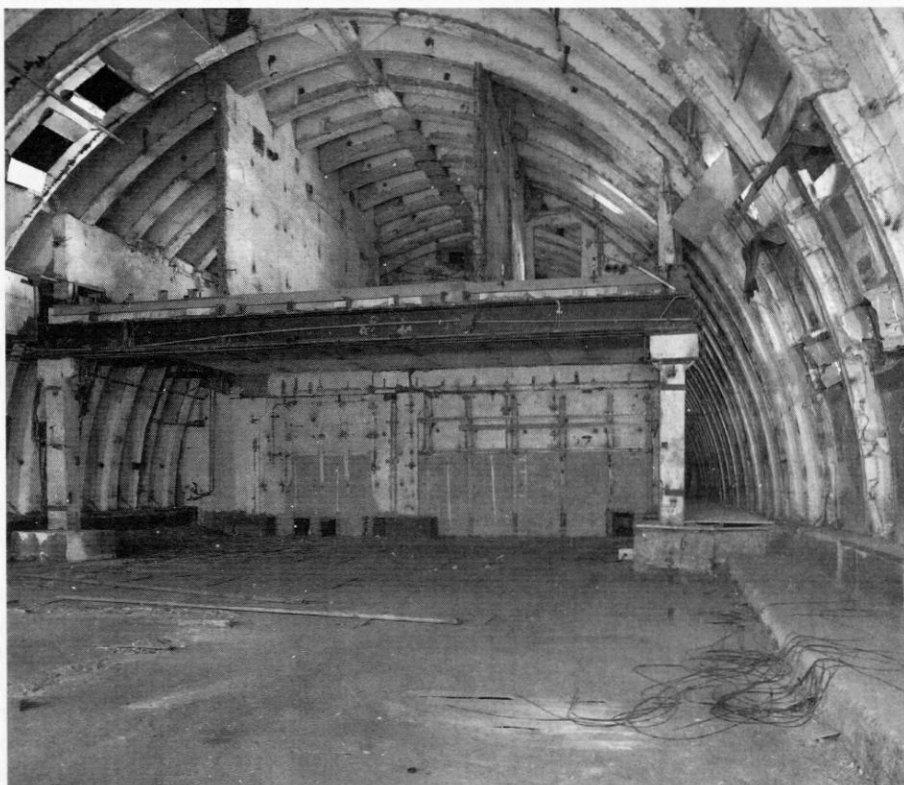
Fortunately, these military sites do not suffer excessive vandalism and graffiti which is present in far too many British sites. Germans may occasionally visit these buildings but they do not seem to need to let everyone know that 'they were here'. Leading out from the heating plant were various ducts, jointing pits and underground pipeways. Near to the heating plant building we found a vast empty building with signs of large machine beds and exhaust extraction equipment mounted on the ceiling. This, we deduced, was the main generator building. There were odd tiled bays located across one end of the building whose purpose remains unknown, at the other end of the building was the main air intake which contained water-based chilling equipment and filters. Set into the floor approximately half way down the building was a large pit with staircase down leading through a short passage into a separate room next door. Quite why this was specified in the original design is a mystery to us as its only apparent purpose appears to have been to enable engineers to inspect the underside of a large piece of equipment and to access this inspection pit from an adjoining room.

We returned back towards the main barrack area and spotted a large Beech tree with initials carved deep into its ageing trunk. Most of these inscriptions carried dates from the 1950s and we assumed that these referred to the birth dates of the bored conscripts who whiled away their time on this tank base miles away from their homeland. It must be borne in mind that the vast majority of this sites' residents never ventured outside its high

fences except, perhaps, on military manoeuvres. At the far end of the site we found a very small sauna attached to a garage, complete with its rocks still over a fireplace. A path could still be traced down to the nearby lake where the steaming officers would no doubt rapidly cool down once they had broken the ice off the water!

Walking around in the deserted base, my thoughts kept drifting back to those Former Times. The Russian soldiers had arrived here on a three year posting by train, with their tanks and equipment from the four corners of the Soviet Union. Altengrabow was their home for the next three years, and in the main they weren't allowed to leave the base. The

lucky few brought their families to live in the blocks of flats built on the outskirts of the main barrack area; the rest lived in the huge multi-storey barrack blocks around the parade ground, now awaiting demolition. Life here must have been bleak, but better than to be found back in the USSR – so in 1989 when the wall came down many stayed behind preferring post-cold war Germany to the uncertainties of the Motherland. As we walked round the site with its abandoned buildings obviously in a state of utter decay, it was impossible not to notice how poorly the buildings were constructed. All were built to a very low standard, with the unique soviet bricklaying technique that seems to defy gravity, staircases with varying and uneven tread, built on site from what ever was



One of the stripped operations rooms in "UK20" at Wunsdorf photo by Nick Catford

available. Grim.

After over four hours, and countless reels of film (Robin, being fully Digitised, dismissed my 35mm film as 'so last century'...), a frantic mobile phone message from Dan told us that he was coming back (as a non-Trabant owner...) and that Mike had divulged the fact that if we wished, we could have a look in another Soviet bunker at Wunsdorf. "...If we wished" ? Sorry?

The photography took on a further sense of urgency and, with job totally done, we piled into the car and raced (really!) back to Zossen Wunsdorf, a familiar area for us now. The quickest cars really are Rental Cars aren't they...

A Day Trip to Altengrabow, Germany.

For information relating to the Zossen Wünsdorf site, see the other reports published in this, and previous, Sub Brit publications, but in essence:

Wünsdorf was the HQ of the Group of Soviet Forces in Germany (GSFG), aka in its later days as Western Group of Forces (WGF), in contrast to the Northern Group in Poland (NGF), the Central Group in Czechoslovakia (CGF), the Southern Group in Hungary (SGF), and the North-Western Group (NWGF) in the Baltic countries. WGF incorporated both land and air forces (Note: Mike Barton will talk at the Sub Brit Spring Conference 2004 and provide more details. Book Now !). Each of the forces had their own HQs for war purposes. As described in an earlier report, the WGF HQ had its main bunker in Wünsdorf in the form of the ex-WW2 bunker 'Zeppelin', which operated under the Russians with the callsign 'Ranet'.

As we arrived at Wünsdorf, Mike told us about this other bunker in the complex. He explained that the airforce, 16 Air Army, had its bunker some 200 yards away from 'Ranet' in a separate complex, which it shared with the WGF Air Defence (PVO). The callsigns in use here were 'Okean' for 16 AA, and 'Nikel' for the PVO (Note: Mike Barton and his group in Germany always refer to identified Soviet bunkers by their callsigns as the callsigns were in permanent use by WGF comms and HQ personnel, whereas the geographical location often had three names: the official Russian version, the official German version, and the version from the locals who actually lived nearby. Hence a town or village name is not always a clear identifier.)

The 16 AA / PVO complex was termed UK 20, UK being the Russian abbreviation for bunker (in this case), but '20' is still a question mark.

Having been given the keys to the area and bunker by the custodians of the site, we drove through various locked gates and right up to the bunker entrance. The entrance had been buried and comprehensibly blocked after the Soviet withdrawal, and it was obvious that very few – if any – non Russian eyes had seen inside this bunker for many years. Now revealed, we stood in the half light absolutely gagging to get down there. Well you would, wouldn't you? Suitably attired, in we went.

UK 20 is semi-submerged: you enter at level two from the side into a long corridor. The services and support bunker is to the left, and the 16 AA and PVO bunkers go off to the right from the main corridor. There was obviously a need for these two services (at the time, air defence - PVO - was deemed to be a separate service) to co-ordinate their (inter)actions, but at the same time each of the services has its own intensive input, either from the fighter divisions and regiments in action in the skies, or from the extensive radar network (comms inwards) and the traffic going to the AD missile sites (comms outwards).

The two operational bunkers in UK 20 are very similar in design, with offices for their respective staffs on both levels. Both blocks are of the aircraft-shelter type, i.e. semi-circular ferroconcrete segments bolted together to the desired length. A two-level construction was then 'inserted' - brickwork or prefabricated concrete slabs - to the edges so that the finished bunker has narrow corridors running down the outside of the rectangular construction within the semi-circular shelter. The constructions also have their own main corridor, with rooms going off on each side.

In each case, the two ops bunkers contain a command post and a major situation room, the latter being formed by simply cutting off the upstairs level and leaving the end wall open, so that you can look down into the lower level. Projectors would have operated from level two to beam onto the end wall of the bunker, which would also have been used as a map wall (in fact, there are a few rooms also located behind the 'map wall' before you actually reach the final end wall of the bunker). Staff officers would also have been located on level two to be on call for additional information.

Mike tells us that there were plans in hand to relocate this complex due to its vulnerability and its proximity to the main, Ranet, bunker. However, time and history put an end to the construction work.

Inside, there was quite a lot of junk lying around, but the bunker had been pretty well stripped by its former tenants. The generators were gone, as was anything else of value. There was, however, much paperwork there. We spent some 90 minutes investigating every nook and cranny, and Nick's photographs will tell more than my words ever could. When he puts them on the website, check it out.

The bunker was dry, and undamaged inside. We found the various emergency exits, (now securely fastened) and went into every room. There were a few Soviet-era posters on the wall plus many original signs and labels on doors etc. There was no vandalism-style graffiti as nobody, in our opinion, had ever been down there.

For us, The Trip was Nearly Over, so we exited the bunker, handed back the keys and just managed to wolf down a quick meal in a nearby restaurant before blasting back to the airport for the – delayed – flight home.

It was a brilliant, if very hectic, day which – having got back home at 2am - ended up being another 24hr session. Okay, Dan never got his Trabbie, but we got to see a bunker none of us knew existed. Reasonable deal then.

Our thanks go to Mike Barton for services far beyond the call of duty.

From Tony Page

2003 Study Weekend - Pembrokeshire

From Day one the organization of the sites for the 2003 study weekend was a nightmare with site owners first agreeing to a visit, then changing their minds and in some case, after a little persuasion, agreeing again. The original plan was site visits on Saturday and Sunday with delegates arriving at our 'base camp' at Merrion Camp on the Castlemartin Ranges any time from later afternoon onwards on the Friday. Unfortunately, we quickly had to modify these plans when one of the major sites, the Royal Naval Armaments Depot, Trecwn (near Fishguard) informed us that a weekend visit was impossible as their security staff only work during the week and then only until 16.30. The only solution was to arrange a three day study weekend instead of our usual two event. Apologies to those who were unable to take the Friday off work but the choice of day was completely out of our hands.

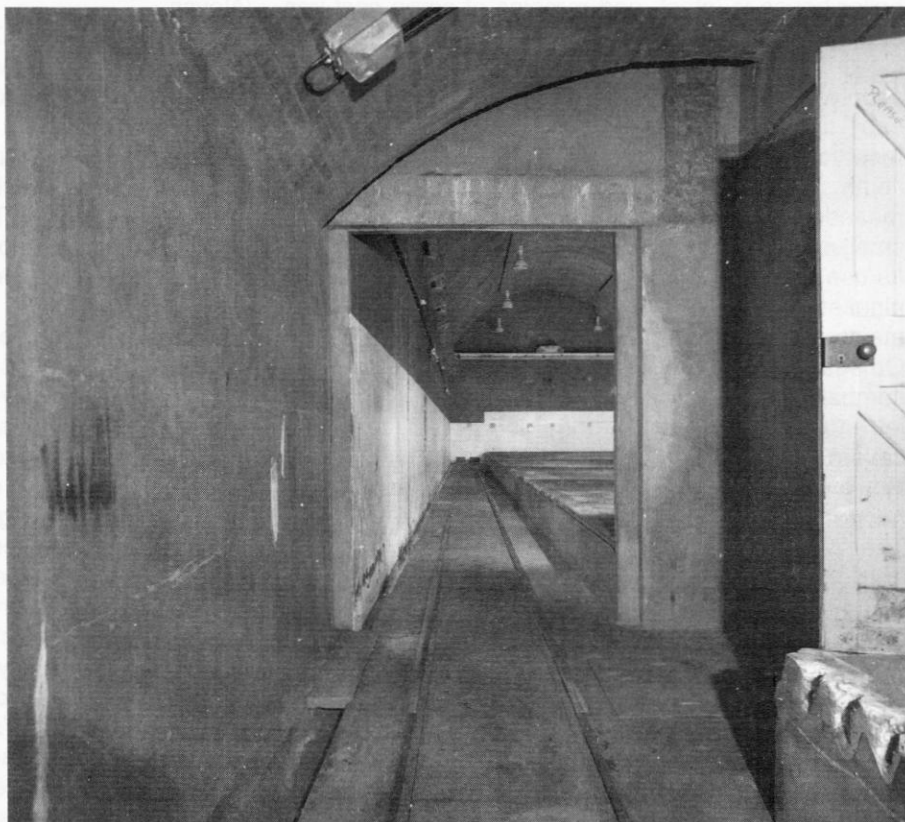
The Pembrokeshire weekend was quickly oversubscribed and the majority of the delegates were able to make it to the front gate of the Trecwn Depot for a 14.00 kick off and that's where our troubles continued!

The visit had been arranged by Medwyn Parry of Royal Commission on the Ancient and Historical Monuments of Wales. He had arranged the visit with a representative from Omega Pacific who had bought the site after its closure in 1986. Unfortunately when we arrived at the front gate and eventually attracted the attention of the maintenance man in the guardhouse he knew nothing of the visit and informed us that the person Medwyn had made the arrangements with had left the company the previous month and the local manager (who also knew of the arrangements) was on leave in America. Potential disaster was however averted as the site manager, who arrived shortly afterwards, agreed to let us on to the site when informed that 40 Sub Britters had congregated in the area from all parts of the country and abroad, perhaps the thought of having to cope with an angry mob helped him make up his mind. Disaster was averted as the gates were opened and we all piled into the site.

RNAD Trecwn is situated just off the A40 trunk road, between Fishguard and Haverfordwest, and is approached along a three-mile stretch of MOD. road,

leading up to the main gate. From this point the secure area runs along the valley, roughly west to East for about two miles, before turning north for the last mile. The area within the perimeter fence covers 504 acres (204 hectares). Outside the security fencing was a further 618 acres (250 hectares) of agricultural land. The security zone contains a large expanse of coniferous woodland, grown to screen the base from prying eyes.

The rock-faced, steep-sided valley was an ideal location for tunnelling the huge underground magazines. The spoil from these were used to level-out the part of valley floor. They were constructed between 1938 and 1941. During the excavation of one magazine, several workmen were killed when the roof of the chamber collapsed.



Storage Chamber at RNAD Trecwn - Photo Nick Catford

There are 58 underground explosive stores, each served by its own narrow gauge rail link. Access is by a short tunnel to a rectangular chamber, constructed with an internal concrete skin, to reduce dampness. There are 28 magazines with an internal volume of 2,778 cubic metres each, and 30 larger magazines of 5,943 metres (a total of 236,074 cubic metres). One railway tunnel provides secure overnight accommodation for a loaded train. There are eleven semi-underground stores, and a total of 389 other surface features, mostly from the 1930s'. The 200 various buildings occupying nearly 300,000 square feet.

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A standard gauge railway connects to the Fishguard to London main line, and there are several miles of track on site, plus an extensive internal narrow gauge railway system linking all the underground stores to most of the surface buildings. Four transfer sheds were used to move goods from the broad to narrow gauge rolling stock, and vice-versa. Other buildings for the two railway systems include loco sheds, maintenance sheds, workshops, refuelling sheds, offices etc.

Trecwn was a storage depot for all types of Royal Navy munitions, and some ordnance from the Army as well as the Royal Air Force. Mines were only stored there after the closure of the Newton Noyes depot near Milford Haven.

The establishment generated its own electricity. The boiler house is intact, and remains of some cast-iron steam heating pipes can be found at various locations. Trecwn also maintained its own water supply, from a network of pumping stations, surface and underground reservoirs. The main surface reservoir and pumping stations are reached up the south side of the valley via "the Burma road", a steep, meandering concrete roadway. Just off site is a small sewage treatment plant.

Its use continued through the cold war until the early nineties when it was placed on a care and maintenance basis and in 1998 sold for £329,000 to Omega Pacific, an Anglo Irish consortium. The company intended to use the surface buildings as a jet engine maintenance facility and the underground caverns for the storage of low level nuclear waste. However due to local opposition this never happened.

The Western Daily Mail (25/10/2003) reported that The Manhattan Loft Corporation, pioneers of loft living in the UK and regenerators of inner city London have taken over Trecwn in a joint venture with property developer Richard Harrington. The surface buildings will be let as industrial units and there are plans to have a sophisticated storage and distribution centre using the 59 underground storage tunnels. The new company is called 'The Valley (Pembrokeshire) Ltd'.

We were allowed to wander around the site at will but because of the size and the dispersed nature of the buildings it was easier and quicker to drive round the depot stopping off at interesting locations. One of the larger storage chambers still has lighting powered by an on site generator, some others were open and unlit.

The narrow gauge rolling stock consists of the well known 'Trecwn' wooden wagons with lifting roofs to enable mines to be lifted in and flatbed trucks for other munitions. Some of the stock can now be seen on the Welsh Highland and Llanfair light railways but there is still a substantial amount on site. Locomotives included small diesel shunters and

battery units some derelict examples of which are on the site. Points on both gauges are manually operated and well greased.

Although derelict since 1986 the site has been maintained in excellent condition with little evidence of vandalism. The site has not become overgrown thanks to the hard work of the small on-site maintenance team aided by a herd of hungry sheep that are given the freedom of the depot.

Our time at Trecwn was short and it was made very clear to us that if we weren't back at the main gate by 16.30 we would be there till Monday, I must say some of us were very tempted!

After breakfast in the officers' mess early on Saturday morning we all piled into our coach for the short journey to the Royal Naval Mine Depot at Newton Noyes.

Work started in 1937 on the construction of RNMD Newton Noyes at Milford Haven on the site of a former manure works. On completion the site was contained within a double perimeter of Dacot fencing, the inner bastioned fence acting as the 'Danger Fence', enclosing the filling factory and the magazine complex. The depot was divided into non-explosive and explosive areas. The non-explosive area occupied the western half of the site consisting of: office, stores, case stores, sinker shops, workshops (engineering, tinsmiths, carpenters, painters etc.) transit sheds, boiler house, canteens etc. The explosive area consisted of: four laboratories, detonator stores, nine underground magazines, shifting rooms, a filling factory etc.

Transport within the depot was primarily by standard gauge and metre gauge rail systems. The metre gauge being adopted as this permits movement of mines on their sinkers without transfer to wagons. Motive power was provided at one time by a mixture of steam, diesel electric and fire-less locomotives. In addition to the rail system, large bulk loads could be loaded or off-loaded from ships by one of three cranes on the depot's jetty. During the second world war, the depot became inextricably associated with the various mine-layers of the Royal Navy, including such famous ships as HMS Adventurer, HMS Manxman, HMS Welshman, HMS Abdiel etc.

Since WW2, the depot has continued to operate in its original role until 1980's, when its closure was announced and its activities were transferred to RNAD Trecwn.

After closure the site was bought by Petroplus who have not yet found any use for it. The western non explosive part of the site is open and freely accessible and the large sheds and workshops have been damaged and vandalized. At the western end of the site a swing bridge brought the standard gauge railway line over a creek into the depot is still in place; it is swung into the open position to allow boats through.

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The explosive area is still secure and overgrown but because of its remote location there has been some vandalism with the heavy steel doors being forced of one of the large magazines. This door now hangs from one hinge and is very dangerous.

The other 8 underground magazines are still locked but we had the keys to open the longest which consists of a 101 metre long entrance tunnel opening into the rectangular storage chamber 28.6 metres long, 10.5 metres wide, with a .68 metres high loading platform. The chamber has an arched roof which was 8.2 meters at its highest point and was similar to those we had seen the previous day at Trecwn. Just before the chamber there is a pedestrian entrance to a number of small rooms which acted as as shifting lobby where the personnel were able to change into their 'safe' magazine clothes.

From Newton Noyes it was a short coach ride into Milford Haven. A network of underground fuel tanks for storing aviation fuel, linked together by a pipeline was built in the hills to the north of Milford Haven in the mid 1930's. There were four groups of tanks, two of two tanks, one of three tanks and one of five tanks.

The tanks were supplied by sea with tanks unloading directly into the pipeline, or by train. The railway siding in the docks is still extant.

After the war the tanks were connected to the national distribution network remaining in use until the 1970's. This fuel network supplied all the major bomber airfields during the cold war.

The largest group of tanks is at Haven Head just above the docks where five buried tanks are linked by a tunnel carrying the underground pipeline. The tank complex is now owned by Milford Haven Docks who gave us permission to enter the tunnel feeding the five buried tanks at Haven Head.

At Haven's Head a tunnel can still be accessed from a small pump house hidden behind two brick and concrete buildings a short distance to the west of Tesco's supermarket in the centre of Milford Haven. There is a high locked grille preventing access to the building and tunnel. From this point the pipeline ran down to the exchange siding at Milford Haven Docks. From the entrance, the tunnel with four parallel oil pipes is inclined steeply upwards for forty feet; there are steps alongside for pedestrian use. The pipes are

of approximately 12" in diameter. A fourth pipe of slightly narrower diameter is mounted on a framework above the four pipes at this point. At the top of the incline the tunnel slopes gently upwards (north) through the Haven's Head tank farm, with four tanks on the left and one on the right. In the tunnel there is a wall with a steel door between each tank for isolating the tanks in the event of leakage or fire.

At each tank there is a feed from two of the four parallel pipes passing through a series of valves into the tank. There is a circular inspection hatch in front of each tank which is securely bolted in place. Opposite each tank there is a short stairway up to a wooden door out to the surface. Each of these doors is blocked with soil and rubble at the surface.

The tunnel, including the incline, is approximately 250



Milford Haven Underground Fuel Store - Photo Nick Catford

yards in length, 7 feet high and rectangular in section. The fuel pipes and valve gear remain in good condition. A smell of aviation fuel pervades throughout the tunnel system.

There is no underground access at either of the two other remaining tank farms.

The Haven Head group of tanks is at SM898064, the other groups are at SM 900070, SM 893071 (demolished) and SM 894071.

For our final visit of the day there was a 90 minute coach trip to the West Pembrokeshire coast and the picturesque and fascinating industrial relic of Porthgain (SM815325)

The village is situated in a narrow steep sided valley some seven miles from St David's Here crushed stone was being exported from the narrow stone

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harbour as early as 1878 by the Porthgain Village Industries Ltd., The company rapidly prospered, trading by sea with the west of England, South Wales, and Ireland. Unfortunately the slump during the late 1920s saw the company go into receivership, but remarkably, small loads of stone continued to be produced up to the 1940s.

The complex consists of quarrymen's cottages, brick works, machinery shed, 15 stone and brick-built crushed stone hoppers, a pilot's house, lime kiln, harbour, and various trackways, building footings, inclined planes etc.

The buildings served four quarry complexes, all accessed by a 3ft narrow-gauge steam railway. St Brides or Porthgain slate quarry was originally served by incline planes, but as it grew deeper, these were replaced by aerial ropeways known as 'Blondins', but eventually it was served by a 1 in 60 gradient tunnel running down to the quayside through the hill beneath the stone hoppers.

Pen Clegyr Quarry was served by a 107 yard incline of about 1 in 3.6 operated by a stationary steam engine, while the St Bride's slate quarries at Abereddi were served by the narrow-gauge railway from Porthgain. Most of the buildings apart from the cottages are now ruinous, but the magnificent coastal scenery and the ruins combined to create a memorable atmosphere and a relaxing end to the day.

We met a representative from the Pembrokeshire National Park who arranged access to the tunnel from the quayside into the centre of St. Bride's slate quarry. The first few yards of the tunnel are used for storage but beyond this there is a second locked gate giving access to the unlined tunnel through the hill. The last fifty feet of the tunnel are of cut and cover construction bring it out into the middle of the quarry, well away from the quarry faces. The quarry floor is now heavily overgrown so most people didn't venture far beyond the tunnel portal. A few of us were able to climb out of the quarry while the rest retraced their steps to the quayside and up the steep cliff path to joining the tramway to Porthgain Quarry where a number of buildings still stand in a ruinous state.

Our evening social gathering was a semi-formal affair with smart dress required for our meal in the officers' mess. As one or two of us are not known for our sartorial elegance the whole experience came as something of a culture shock. Our after dinner speaker in the camp briefing room was Roger Thomas from English Heritage who joined us for the three days and helped organise some of the site visits.

Roger is an expert on Pembrokeshire having lived in the county for much of his life and he gave us two presentations. The first on the military history of the county detailing the various fortifications that have existed over the years and the second was a history

of the tank range at Castlemartin. Both were well received by the enthusiastic and attentive audience. To round off the day we all retired to the bar or to bed, it had been a long and enjoyable day.

In recent years the programme of events on the Sunday has been shorter but this year we decided on a full programme and as the theme for the weekend had been mainly military we included an option of a visit to two disused mines. Unfortunately, apart from slate and coal there was little mining of any consequence in Pembrokeshire and nothing of any interest that is currently accessible. It was therefore necessary to travel up to mid Wales where we arranged visits to the Lead Mine at Cwmystwyth and the copper mine at Ystrad Einon. Because of the long distance most people opted to stay in Pembrokeshire and the first visit was to the cold war rotor radar station at St. Twynells, only half a mile from our base camp. The impressive R6 operations block was clearly visible from our barrack block windows.

A full report on St. Twynells was featured in Issue 1 of Subterranea so I won't repeat any of it here. We were given the freedom of the site which included the two level R6 bunker and the Type 80 modulator building on the other side of the road. As a bonus there is a Royal Observer monitoring post in the same field as the R6 bunker. The land owner lost the keys years ago but he allowed us to cut the padlocks off which gave many of the delegates their first opportunity to see inside an ROC post.

Not the entrance to a network of roads, offices and shops that CND led some of their members to believe but a 13' X 8' room where members of the Royal Observer Corps would have monitored the effects of a nuclear attack. There were 1563 of the built, all identical and St. Twynells is very typical with some of its furniture remaining in place together with a few papers from the 1980's.

We also had the opportunity to look at a post war Gee H parabolic air navigation station that was located in the corner of the field adjacent to the Type 80 modulator building.

GEE was highly effective and accurate as an aid to navigation, but it lacked the pin-point accuracy needed for a bombing attack on a selected target. A British scientist Alec Reeves developed a through-the-clouds bombing technique known as OBOE. By mid-1944 the principle of OBOE was combined with GEE and a blind bombing technique known as GEE H was developed allowing strikes to be made on difficult-to-hit targets. The station at St. Twynells is a post war upgrade of the Gee H. The building has now been converted into a house but externally there have been few alterations, even the steel window shutters still remain in place. The owner of the house was on hand to answer speak to those people who took the trouble to wander over and he even allowed some people inside his house which still retains some

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internal features of the Gee H station.

Our second site on Sunday was Scoverston Fort (SM945066). There have been numerous plans to build fortifications to defend Milford Haven dating from the late 16th century. In 1859 The Royal Commissioners proposed to build three defensive lines with a line of six forts in an arc to the north of the Haven and five to the south and a third line of forts at Tenby. Sufficient finances weren't however available and the only fort to be built at Milford Haven was at Scoverston, the central fort in the northern line. This fort too was due to be axed but work eventually went ahead in August 1861 because of its strategic location covering the approached to both Milford Haven and Neyland. The estimated cost was £76,000 but by 1863 this was reduced to £50,000 by omitting part of the barracks and revetment walk where they could be safely dispensed with. The eventual cost was £46,462.

The hexagonal fort with 130 yard long sides was surrounded by a dry ditch 36' wide at the bottom and a drawbridge for access. The escarp was high faced masonry and the counterscarp cut in rock. It was flanked by one double and four single caponiers each having four embrasures and eight loopholes. The work was enclosed by an earth rampart, covered way and glacis.

The original plan for Scoverston was for 20 guns and 300 men but this was upgraded to 32 guns on the ramparts. The rear faces were protected by parados from

reverse fire and traverse thrown across the interior parade for the same purpose. The garrison was downgraded to 128. Construction included a central magazine, stores and bomb proof casemates.

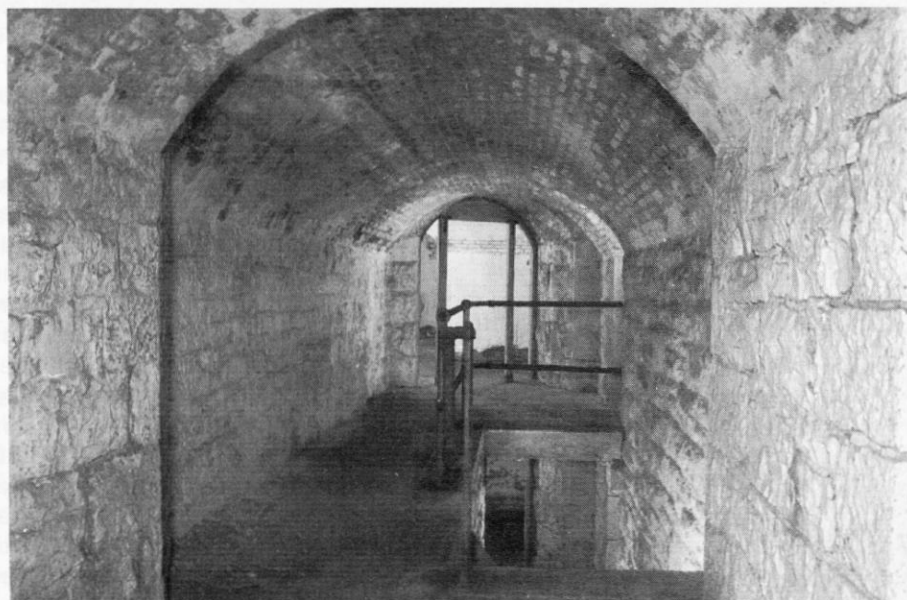
The fort was completed in April 1864 but was never armed and was only used as barrack accommodation; it was abandoned after WW1 being sold in 1932. It was revived briefly in WW2 when an anti-aircraft gun battery was sited there but after the war it reverted to private ownership and has remained derelict ever since.

The fort covers 75 acres of land and is heavily overgrown. Because of vandalism and theft of timber due in part to the ease of access over the earth ramparts the owner now actively discourages visits but was prepared to allow a visit by Sub Brit after some persuasion.

The covered way through the rampart is securely locked and our access was through a wicket gate in

the main double doors. Immediately inside the fort the mens quarters are immediately in front of the covered way and consist of a rectangular masonry barrack block. There is a reasonably clear path through the undergrowth to the north side of the fort where the officers quarters are located in casemates built into the ramparts. In the centre of the casemates is a short tunnel to the double caponier which is in good condition. A small magazine is located at the lower level with a shaft for an ammunition lift alongside; it's unlikely the lift was ever installed.

To the west of the casemates steps lead down to the main magazine consisting of a large vaulted chamber with a lighting passage running around it. Considerable undergrowth clearance was required to gain access to the magazines. A well, now covered with a steel sheet was noted close to the magazine.



Scoverston Fort Underground Gallery - Photo Dan McKenzie

The four single caponiers around the ramparts are all open but access is very difficult due to the thick undergrowth, only a few of our party braved the brambles to reach them. They are generally in good condition with timber doors and stairways largely intact. One complete stairway was however removed by thieves some time ago and some of the floorboards were set fire to by vandals in 1984. A number of masonry shelters were noted on the ramparts.

Some years ago local burglars hid their proceeds in the fort and there is still police tape around the fort dating from this time. The police carefully swept all the floors in the caponiers and casemates looking for evidence and some of these swept piles of debris are still visible. After our visit to the fort there was just time for a brief lunch break on the grass before we made our way to the final location of the weekend.

The Saundersfoot Railway was built to serve a number of collieries and the Stepside Iron Works.

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Various Tramways had been proposed on a number of occasions during the late 18th and early 19th Centuries due to the obstructive nature of Lord Milford, but by 1833 the first sections of track had been laid between Thomas Chapel and the harbour at Saundersfoot.

The section to Wiseman Bridge completed in 1836 was built on a sea wall skirting the high tide mark beneath the cliff and involved the construction of a number of tunnels. This line was eventually extended to Lower Level Colliery, between Stepside and Kilgetty. The success of the railway and the harbour can be judged by the increase in trade; in 1833 11,497 tons of coal and culm were exported, but by 1840 this had increased to 39,405 tons.

The Pembrokeshire Iron and Coal Company opened

custom gradually dwindled away and smelting ceased after 1873. The line of the Saundersfoot Railway is now a public footpath which passes through a number of short tunnels passing the grided adits of several iron mines. We were joined at the site of the Grove Ironworks by mining historian Peter Claughton who led us on a walk around the now preserved ironworks site where the shells of the blast and blowing engine house and the cast house and refinery have been preserved along with a number of kilns. We then walked up to the site of Grove Colliery where a fine Cornish winding engine house still stands in a clearing in the woodland. The winding and pumping shaft has been capped with concrete. A number of other ruined buildings including a second engine house stand in the undergrowth nearby.



Ystrad Einon Underground Waterwheel - Photo Nick Catford

its ironworks at Stepside in 1849 and by 1864 was exporting 3,000 tons of pig iron annually through Saundersfoot

Harbour. Unfortunately, this trade was brought to a sudden halt in 1850 when there was an explosion in the works and the trade slumped.

From 1853 - 59 Grove Colliery was sunk directly behind the ironworks to provide a direct supply of coal; however, although a number of attempts were made thereafter to regain its lost trade the ironworks never achieved the same degree of success and

By now it was late in the afternoon and it was time to return to the coach for the journey back to Merrion Camp. However those who took the mining option were not due to emerge into daylight until the early evening.

The first mine to be visited was Ystrad Einon a few miles south of Machynlleth. Ystrad Einon Copper mine worked a NE-SW lode which is unusual in mid-Wales and is largely restricted to the Dovey estuary. Development of the mine below adit level did not start until the late 19th century with the sinking of a winze to the 12 fathom level in 1871. A 16' diameter underground waterwheel was installed for pumping and lifting; this allowed the mine to be deepened by another 12 fathoms. The mine continued to expand with a new engine shaft down to 30 fathoms and on the surface a 1.5 mile leat was constructed to bring water to a new 22.5 foot diameter waterwheel for pumping and winding and a smaller wheel for driving a stone breaker and crushing rolls. A third waterwheel drove two 20' diameter buddles

and a six compartment jigger.

Although the new plant was ready for use in 1877 full production didn't start till 1891 once the ore reserves had been established. The reserves were, however, to prove disappointing and by 1897 only 9 tons of lead ore, 10 tons of blende (zinc) and 45 tons of copper ore had been mined.

The remains of the mine are located on the edge of a conifer plantation on the south side of Cwm Einon (Artists Valley), at the end of a steep and narrow minor road running 1.5 miles from the A487 at

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Furnace Bridge. The most prominent feature is the stone crusher house with a large waterwheel pit on the north side. Below the crusher house there is a second wheel pit and the two buddle circles. Alongside are the walls of the jigger building. The remaining buildings are surrounded by fencing with a modern stairway up to the crusher house. The stairway continues above the crusher to the new engine shaft which has been capped with a substantial steel grille.

The whole area has been landscaped to allow public access but the work appears to be unfinished with the fencing extending across the bottom of the steps to prevent them being used. A report published by the Welsh Mines Society is critical of the limited restoration stating "the crusher house has been pointed with little regard for the manner in which its walls were constructed, large amounts of spoil have been un-necessarily removed from around the house and a large number of substantial fences erected without regard to the site layout. The whole presenting an appearance which relates neither to the site when working nor in decay." The whole site is a scheduled ancient monument. There are two accessible adits, both have been gated but are not locked. The first adit is 70 yards north of the crusher house at the top of a substantial spoil tip; there is a little water in the entrance. After a short distance the level turns to the right into a small stope. It is possible to climb down into the stope but further progress is blocked by falls.

The main adit is accessed along a path running north from below the crusher house. It's located at the end of a shallow cutting excavated into the hillside and there is no obvious spoil tip. After a short distance there is a 'T' junction where the 16' diameter overshot waterwheel is located. This is one of only two underground waterwheels surviving and accessible at any abandoned mine in the UK. The flooded winding and pumping shaft is a few yards to one side of the wheel with a rusty pipe still protruding out of the water.

Back at the 'T' junction the level runs south to the new engine shaft which is open to daylight 80 feet above. Care should be taken approaching the shaft as the level passes through a flooded stope and it is necessary to walk on wooden boards to one side. At the base of the shaft there is a 10 foot climb up to a higher level where a large rusty kibble stands at a crossroads. The level is blocked left and right after a short distance but straight ahead it continues several hundred yards to a collapse. However extreme caution is required here as there is a flooded and partially boarded shaft in the floor which cannot be seen as there are several inches of water over the floor at this point.

Clive Penfold takes up the story.... We had taken rather longer than expected at Ystrad Einion and after a dash over the mountain on dirt roads we

arrived at Cwmystwith Mine over an hour late. Unfortunately, there was no one around who looked as if they were there to meet us so we went in search of the mine entrance. It wasn't difficult to spot so we decided having come all this way it would be a shame not to have a look inside. After a wriggle through a plastic pipe, we were in the adit. However, the water in front of us looked deep; knee deep in fact. Apparently it is deliberately kept at this level to deter casual visitors. After wading through the cold water for 20 yards, and another 100 yards or so, after passing a chamber on the right with a small skip in it, we arrived at the main working area. A couple of gear bags were on the floor indicating that we were not alone in the mine.

Above us a large area of stemming work (wooden crossbars serving as supports) held back many tons of deads. In front of us a great fissure 6 feet wide rose some 50 feet above us inclined at about 20 degrees. Below us, the fissure continued downwards for at least 30 feet. The fissure was spanned and braced at regular intervals with timbers and attached to these were 2 rails presumably to guide the skip we had seen earlier. As we looked at this in awe, we were aware of lights above us and a small shower of rocks confirmed that someone was above us; we had met our guides. After introductions, they were keen to show us around the mine.

Retracing our steps slightly, we rounded a corner to confront a 50 foot inclined ladder. Ascending this we passed through a hole in some stemming work at the top to emerge on another level. Passing through some impressive caverns and descending some large piles of deads we found ourselves back where we started. Quite a good little round trip. Next was the difficult bit. One at a time we ascended a short ladder traversed onto the timber bracing in the fissure and climbed up some 40 feet to reach another ladder. Ascending this, we then had to propel ourselves off the top of the ladder through a small hole in more stemming work. It was well worth the climb. On the upper levels we saw a superb Roman level complete with pick marks and an enormous stone wall made of deads. The chambers up there were laid out like a Gruyere cheese; the tramways were straight out of Indiana Jones - amazing.

Unfortunately, the only way down was the way we had come up - even more difficult. We eventually emerged into daylight around 5.00pm and headed for the nearest pub on the way home for a well-deserved pint.

Parts of this report were written by:

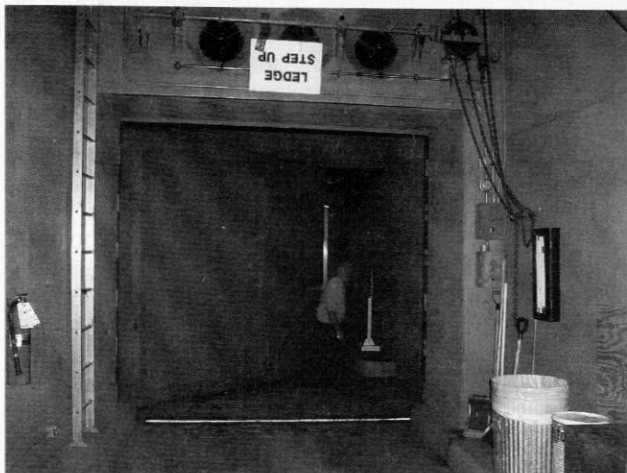
**Nick Catford
Roger JC Thomas
Medwyn Parry
Fortress Study Group
David Bick
Clive Penfold
Dave Mansell**

Subterranea Britannica - Summary Report 2002

Summary Report 2002				
From 1 January 2002 to 31 December 2002				
			Period ended 31 Dec 2002	Period ended 31 Dec 2001
INCOME/EXPENSE				
	INCOME			
	Membership Subscriptions		9,031.00	6,677.00
	Publication Reprints		18.00	32.00
	TOTAL INCOME		9,049.00	6,709.00
	EXPENSES			
	Affiliation Fees		159.90	62.00
	Bank Charges		5.50	-
	Insurance		795.75	838.95
	Miscellaneous expenses		10.00	37.65
	Post, Packing & Stationery		508.83	882.33
	Printing		5,401.43	1,077.15
	Computer Equipment		239.44	250.00
	Depreciation - P.Sowan's PC etc		559.82	168.06
	TOTAL EXPENSES		7,680.67	3,316.14
	SELF-FINANCING ACTIVITIES			
	Mistley trip		(40.00)	-
	Income from Conferences		2,230.50	2,537.00
	Outgoings from Conferences		(1,757.97)	(1,951.82)
	Income from Study Weekend		3,284.00	2,377.00
	Outgoings from Study Weekend		(3,537.49)	(2,412.44)
	TOTAL SELF-FINANCING		179.04	549.74
	TOTAL INCOME/EXPENSE		1,547.37	3,942.60
	BROUGHT FORWARD		7,738.51	3,795.91
	ACCUMULATED INCOME		9,285.88	7,738.51
	NET ASSETS			
	OFFICE EQUIPMENT		-	559.82
	CASH			
	Unity Trust Bank		8,258.43	5,616.61
	GiroBank		1,994.65	2,218.14
	Cash Floats		369.30	(336.21)
	PAYMENTS IN ADVANCE			
	Insurance		-	795.75
	RECEIPTS IN ADVANCE			
	Subscriptions		(1,336.50)	(397.00)
	CREDITORS			
	Printing		-	-
	Conference		-	(718.60)
	Insurance		-	-
	TOTAL		9,285.88	7,738.51
Gerald Tagg, Treasurer				16 Oct 2003
I confirm that I have examined the books of account and find the above statement in accordance with those books.				
D.A.Kozubska, FCA				16 Oct 2003

Letter to the Editor

The Green briar Congressional Bunker - From Roger Cleaver



One of the main blast doors - Photo by M Jacobs

Whilst on holiday recently in the United States, I took a drive to white sulphur springs in West Virginia to visit the green briar congressional bunker. The town is quite small spread along both sides of a beautiful country road and has a couple of dozen houses a few shops a bar motel police office (closed) and a small civic centre which advertised bunker tours on Sundays at 1.30pm. this being a Thursday and the fact that I was not staying in the area or passing back that way on the coming Sunday and couldn't find anybody who would give an out of hours tour, I decided to take a look for myself. The huge bunker under the hotel was kept secret for over 30 years from the hotel guests and even the staff until exposed by the Washington post in 1992. The hotel built in the 1920,s by the Chesapeake and Ohio railroad company had long been a favourite of the wealthy and famous including presidents and foreign statesmen and was requisitioned for a military hospital during WWII but buy the 50's it had once more regained its splendour and elegance. It is likely that is military use during WWII influenced the decision to locate the most luxurious of all the 'continuity of government' bunkers the congressional nuclear retreat codenames "Greek Island" here in west Virginia it was designed accommodate the senate and house of representatives with a support staff of 1200, with a floor area of 112,000 sq feet and was built during the years 1959- 1962 the huge task under the disguise of being an extension to the hotel, the ruse being so successful that the vast senate chamber room was used as an exhibition hall for 30 years before its original use was revealed, the 28 blast doors, that seals the bunker, being concealed behind false panelling in the entry corridor.

Construction of the underground, reinforced two storey bunker in a 70 foot deep cavity required the pouring of 50,000 tons of concrete that forms the foundation, walls and bomb proof roof, which have a minimum thickness of three feet, entrance being gained at four points on the first floor. The 450

entrance tunnel, large enough to drive a truck down, is in a wooded valley behind the hotel sitting open for me to stroll in, beneath an air-conditioning tower.

Two other entrances are within the hotel building, now fully lit and carpeted and used by guests and staff as part of the hotel complex. The fourth entrance is a small service door in a ventilation airshaft.

The second floor is taken up by a assembly hall and 18 dormitories with bunks fore 60 personnel; part of this floor also house three 14000 gallon fuel tanks for the power house and three 25000 gallon water tanks. These together with a stockpile of refrigerated and dried food would allow the bunker to operate in closed mode for a minimum of forty days. The also has a deep artesian well with pumps, about one mile away.

The first floor houses the second assembly chamber (now used as the hotel exhibition hall) and most of the plant and utilities, a large power house contains three Fairbanks Morris 675 KW diesel generators, anyone of which is capable of supplying the full load of the building, as well as boilers and refrigeration equipment for the air conditioning and ventilation systems. A 17500 sq foot dining room could seat 400 people at a sitting. The floor also contained a TV broadcast studio and a lecture theatre. There was also a medical centre with X-ray facilities, a pharmacy, dental facility and even an intensive care unit, also a strong room for important state documents, which also doubled as the armoury.

All in all, a very interesting and worthwhile visit, during which nobody questioned my presence in staff only areas, and various hotel personnel were quite happy to point out features and give directions to help.

If you're ever out that way, get on the Sunday 1.30pm tour from the civic centre, which is half a mile to the left out of the hotel main gates, on the opposite side of the road. Failing that, take your own tour like I did! It's well worth it.



Hotel entrance to Bunker - Photo by M Jacobs

The BIAS Brunel Prize

The Brunel Industrial Archaeology Society has established a prize, known as the BIAS Brunel Prize, to encourage archaeological and other research into, and the publication of work on, the industrial archaeology of the Bristol/Bath region.

The Society chose to devote the income from the residual funds passed to it by the former Brunel Society to the foundation of this prize. The revenue will be subsidised, if necessary, so that an amount of £150 will be made available every two years, having been awarded for the first time in 1997.

Competition is open to BIAS members and to other persons or groups with an interest in the industrial archaeology of the Bristol region.

Entries should consist of a written report or record which should: conform to the guidance notes for BIAS Journal, and should not have been published

elsewhere, either privately or otherwise, in whole or in part, nor submitted for another prize competition reflect original research into and/or recording of IA sites in the region, with source references be submitted by 31 August in the preceding year (e.g. 31 August 2004 for the 2005 competition) Entries will be considered for publication in the BIAS Journal

A panel consisting normally of the Society's President, Chairman and Journal Editor together with up to two co-opted members, one of whom should if possible be from outside the Society, would decide on awards. The decision of the panel, who reserve the right to vary or withhold the award, will be final.

Further details can be had from Mike Bone, "Sunnyside", Avon Close, Keynsham, BRISTOL BS18 1LQ. '

SB Spring Day Conference – 13th March 2004

This year's Spring Day Conference sees us return to Imperial College in London. We will be using the larger capacity Lecture Theatre 1.31 on the first floor of the Royal School of Mines building on Prince Consort Way in South Kensington.

The Spring Day Conference sees possibly one of the strongest line up of heavyweight speakers at any of the recent Day Conferences.

Sub Brit member **Mike Barton** is travelling from his home in Nuremburg, Germany to tell us about the cold war bunkers of East Germany. Mike was an intelligence officer in the British Army for 20 years, most spent decoding intercepted Soviet messages in the then West Germany. After leaving the Army he worked for Siemens as a translator until retirement a few years ago. Now able to indulge his passion for bunkers to the max, Mike (who speaks and writes word perfect German and Russian) has been able to gain access to a huge number of former cold war facilities ranging from command and control bunkers to nuclear warhead stores. His contacts have gained him access places that most Soviet Generals wouldn't have been able to enter at the height of the cold war. Mike's talk will be split into 2 parts and will contain dozens of photographs of the inside of some of the most secret places as well as an overview of the geo-political situation at the time.

Paul Pattison from English Heritage will give us an in-depth tour of the Western Heights complex in Dover. Paul will cover both the surface and underground parts of the area and he is an acknowledged expert on this subject. The talk will be illustrated with numerous photographs.

Just after lunch we will have an exclusive screening of the film '**Soviet Civil Defence**'. The Advanced

International Studies Institute of Miami University made this film in 1980. It covers the preparations made by the Soviets for Civil Defence during the Cold War and describes the emphasis placed on Civil Defence training for all members of Soviet society.

After the second part of Mike Barton's presentation, our final speaker will be **Peter Laurie**. Peter is the former editor of practical computing and is a journalist and editor of note. He wrote the book 'Beneath The City Streets' which has become essential reading for those researching the workings of Government civil defence and post nuclear war operation. We are very fortunate to have Peter coming to speak to the Spring Day Conference.

As usual, we will have brief member contributions at the end of the day so please bring along some pictures to show or video to watch. All will be welcome to contribute. All audio-visual equipment will be provided. Please contact me, before the conference if you wish to make a short contribution.

The day starts with coffee and registration at 9.30am and will finish around 5pm. You will be able to purchase lunch in the Imperial College Student Union Refectory (which also has a licensed bar) or there are numerous food outlets nearby.

As your new Events Co-ordinator, I am trying to improve facilities at the day conferences and we will be using raked lecture theatres for both the Spring and Autumn day conferences in future. Sub Brit has also purchased a small PA system with radio mike so that all speakers can be clearly heard.

I look forward to seeing you all on March 13th.

Andrew P Smith - Conference Organiser

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